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The five essays collected in this issue are part of the materials presented at the Conference on "Sraffa's *Production of Commodities by Means of Commodities* after 25 Years", promoted by *Political Economy* and held in Florence in August 1985. Some more papers from the Conference will be included amongst the contributions to be published in the third issue of *P.E.*

# Sraffa's Critique of the Marshallian Theory of Prices\*

Paolo Sylos Labini

Although our Conference is devoted to an appraisal, after twenty-five years, of the most important of Sraffa's works, I think that today it is worth while to reconsider as well the critique of the Marshallian theory of prices expounded in the articles of 1925 and 1926 not only better to understand the intellectual itinerary behind *Production of Commodities*, but also because they contain hints that, in my opinion, have not yet been fully developed.

1. According to Sraffa, at the root of the inconsistencies in Marshall's theoretical construction and especially in his treatment of the supply curve we find the heterogeneity of the two laws of returns, that of increasing and that of diminishing returns: the former represents largely the consequence of the process of the division of labour and was originally considered in relation to the problems of economic growth, the latter, which presupposes as given one of the factors of production, was originally considered in relation to the problems of income distribution. Now, such heterogeneity appears even sharper if we consider separately the two great classical economists whose works can in many respects be considered to be at the origin of those two laws, or tendencies: Adam Smith and David Ricardo.

The differences are great indeed. Smith was almost exclusively interested in the conditions governing the economic growth of nations and very little in income distribution; Ricardo, on the contrary, was almost exclusively interested in the relations between prices and income distribu-

\* Paper presented at the Conference on "Sraffa's *Production of Commodities by Means of Commodities* after 25 Years", Florence, August, 1985.

tion and very little in economic growth. Correspondingly, the theories of value of Smith and Ricardo are different: Smith needed a standard of value to be used mainly in intertemporal comparisons, to understand how the economic progress was affecting the different commodities; Ricardo needed a standard of value which could be relied upon to measure the exchange ratios between commodities. In Sraffa's words: "the problem of value which interested Ricardo was to find a measure of value which would be invariant to changes in the division of the product"<sup>1</sup>. It is true that Ricardo, as well as all the other classical economists, attributed the greatest importance to the process of economic growth; in fact, he was interested in income distribution in order to understand how a change in such distribution could hinder or, conversely, favour accumulation; but it is also true that Ricardo's analytical apparatus is basically different from Smith's since it is concerned with different problems.

Let us consider, first, the division of labour. According to Smith, this process goes on at different speeds, depending on the peculiarities of the different productions; moreover, in the case of certain goods, it encounters special obstacles or limitations. This, for instance, is the case of cattle and minerals; indeed, as long as there is uncultivated land, cattle cost little more than the labour of catching them and their real price is stable. But when cultivation is extended over the greater part of the land of a given country then to supply the increasing demand of the consumers it becomes necessary to breed cattle by cultivating land to raise food for them and by tending them; in such circumstances the real price of cattle tends to increase, although certain improvements in breeding cattle can, for certain periods, counteract such a tendency<sup>2</sup>. Minerals, too, tend to become dearer and dearer since mines are limited and "the discovery of new mines is a matter of the greatest uncertainty"<sup>3</sup>.

According to Smith, then, the real prices of the above mentioned productions tend to become dearer and dearer; but such tendencies have little in common with Ricardo's diminishing returns relating to agriculture as a whole; this tendency takes place when, with the increase of population, land of less and less "fertility" is brought into cultivation. Contrary to a widespread belief, Smith's views concerning a great and important part of agricultural products, that is, corn and other vegetable products, are very different from those of Ricardo. Smith believes that in vegetable products the division of labour meets with no appreciable

<sup>1</sup> *The Works and Correspondence of David Ricardo*, edited by P. Sraffa with the collaboration of M. H. Dobb, Cambridge, Cambridge University Press, vol. I-X (vol. XI Indexes), 1951-55, vol. I, Introduction, p. XLVIII.

<sup>2</sup> A. SMITH, *An Enquiry into the Nature and the Causes of the Wealth of Nations*, London, Methuen, 1961, bk. I, ch. XI, pp. 166-8.

<sup>3</sup> *Ibid.*, pp. 262-3.

obstacle, so that it tends to determine an improvement of the productive powers of labour and thus a progressive fall in the real price of such products. But since "the nature of agriculture does not admit of so many subdivisions of labour, nor so complete a separation of one business from another, as manufactures", then "the improvement of the productive powers of labour in this art does not always keep pace with their improvement in manufactures"<sup>4</sup>. (Observations of this type are probably at the origin of the view that associates Smith and Ricardo in relation to the tendency to diminishing returns in agriculture.) Thus, according to Smith, in agriculture too the tendency to increasing returns due to the division of labour operates, with the proviso that in vegetable products it is slower than in manufactures and that in cattle products such a tendency is likely to be reversed and increasing costs are likely to prevail when there is no more uncultivated land and even the improvements that are introduced in cattle breeding are not such as to offset the tendency to increasing costs. As far as corn is concerned, Smith's position is a peculiar one: corn is a vegetable product and, as such, its real price should fall in the course of time; but corn is produced with the help of cattle, the real price of which tends gradually to increase. On the basis of this reasoning Smith assumes that in the very long run ("from century to century"), the algebraic sum is not far from zero, so that the real price of corn is approximately constant. Now, such a reasoning can be accepted or refuted, but cannot be ignored; and this is precisely what Ricardo does when he criticizes Smith on this score. Here is the relevant passage:

How, then, can it be true, that "if you except corn, and such other vegetables, as are raised altogether by human industry, all other sorts of rude produce - cattle, poultry, game of all kinds, the useful fossils and minerals of the earth, & c., naturally grow dearer and dearer as the society advances"<sup>5</sup>. Why should corn and vegetables alone be excepted? Dr. Smith's error throughout his whole work, lies in supposing that the value of corn is constant; that though the value of all other things may, the value of corn can never be raised. Corn, according to him, is always of the same value because it will always feed the same number of people. In the same manner it might be said, that cloth is always of the same value, because it will always make the same number of coats. What can value have to do with the power of feeding and clothing<sup>6</sup>?

According to Smith, corn tends to be always of the same value, not because "it will always feed the same number of people", but because he

<sup>4</sup> *Ibid.*, ch. I, pp. 9-10.

<sup>5</sup> [*Ibid.*, ch. XI, p. 241].

<sup>6</sup> D. RICARDO, *On the Principles of Political Economy and Taxation*, in *Works, op. cit.*, vol. I, p. 374; see also p. 14.

considers it reasonable to assume that the two contrasting forces mentioned above tend to offset each other. Smith, it is true, points out that he concentrates his attention on corn since "it constitutes (...) the principal part of the subsistence of the labourer"<sup>7</sup>; but nowhere does he make the statement that Ricardo attributes to him. It should be said that Smith is aware of the uncertain character of his assumption; he justifies it with the practical argument that a better alternative seems to be lacking. In fact, the data on wages necessary for constructing the preferable standard (that is, labour commanded, given by the ratio between the price of a certain commodity and the wage rate) often are lacking and therefore we have to content ourselves, *faute de mieux*, with the corn standard, given by the ratio between the price of the commodity considered and the price of corn, on the assumption that the real price of corn changes relatively little in the course of time. Here, again, two relatively long quotations are in order, to clarify Smith's point of view, which Ricardo misinterpreted:

In such a work as this, however, it may sometimes be of use to compare the different real values of a particular commodity at different times and places, or the different degrees of power over the labour of other people which it may, upon different occasions, have given to those who possessed it. We must in this case compare, not so much the different quantities of silver for which it was commonly sold, as the different quantities of labour which those different quantities of silver could have purchased. But the current prices of labour at distant times and places can scarce ever be known with any degree of exactness. Those of corn, though they have in few places been regularly recorded, are in general better known and have been more frequently taken notice of by historians and writers. We must generally, therefore, content ourselves with them, not as being always exactly in the same proportion as the current prices of labour, but as being the nearest approximation which can commonly be had to that proportion. I shall hereafter have occasion to make several comparisons of this kind<sup>8</sup>.

In every different stage of improvement (...) the raising of equal quantities of corn in the same soil and climate, will, at an average, require nearly equal quantities of labour; or what comes to the same thing, the price of nearly equal quantities; the continual increase of the productive powers of labour in an improving state of cultivation being more or less counterbalanced by the continually increasing price of cattle, the principal instruments of agriculture<sup>9</sup>.

The above passages make it clear that Smith needs a standard of value apt to make intertemporal comparisons, since the growth of nations and

<sup>7</sup> A. SMITH, *op. cit.*, ch. XI, p. 208.

<sup>8</sup> *Ibid.*, ch. V, p. 43.

<sup>9</sup> *Ibid.*, ch. XI, p. 208.

the improvements in labour productivity are the main preoccupation of his inquiry: the corn standard represents an approximation to labour commanded, which is the standard to be used when the data of wages are available. The intertemporal comparisons in the value of commodities of different kinds are discussed in detail in the long Digression on Silver, constituting the largest part of chapter XI, book I, which could be more accurately described as a digression on the price of corn in the course of time.

2. Ricardo was so convinced of the inevitability of diminishing returns in agriculture that he does not seem to be aware that Smith's position concerning the conditions of production of corn was completely different from his, so that, when in the *Wealth of Nations* he finds statements pointing in a different direction, he attributes them simply to errors — for Ricardo the corn standard is absurd because it is bound to be upset by diminishing returns. Probably, in this belief Ricardo was influenced by the experience of his time: owing mainly to the consequence of the French Revolution and of the Napoleonic wars, the price of wheat increased considerably during the last decade of the XVIII century and during the first two decades of the XIX century. (In the following decades that price, first, went back to a level not much different from the previous average and then, in the last three decades of the past century, fell considerably.)

If we distinguish the two standards of value mentioned above, that is, the standard to be used in the intertemporal comparisons and the one to be used to measure the exchange ratios between commodities in a given time, then we realize that, contrary to a long standing indictment, Smith is not guilty of confusing the two, that is, labour commanded and labour embodied as he conceives it. According to Smith, labour commanded should be used *both* for intertemporal comparisons and to measure the exchange ratios between commodities. For the latter measure only labour commanded is to be used, since labour embodied can afford a rule for exchanging different commodities only “in that early and rude state of society which precedes both the accumulation of stock and the appropriation of land”<sup>10</sup>. (When Smith refers to the question of exchange ratios between commodities he speaks of exchangeable value and when he refers to the question of intertemporal comparisons he speaks of real price and real value.) However, if we assume a constant wage share in total product, for the intertemporal comparisons the two standards are, in fact, equivalent in the sense that they give the same results. The said indictment — that goes back to Ricardo, was repeated by Marx and then by a host of other economists — is not really justified and arises from the failure to

<sup>10</sup> *Ibid.*, ch. VI, p. 53.

properly understand the two standards of value (see the Appendix I). Labour commanded by a given commodity is the ratio between the price of that commodity and the wage rate ( $P_i/W$ ); its inverse is the purchasing power of the wage rate in terms of that commodity, a purchasing power that is bound to increase hand in hand with the productivity of labour. Labour commanded is a standard that, as Smith said, can be used to measure the value of a particular commodity not only at different time but also in different places, particularly when prices are expressed in different money units. By necessity, such a standard is not and cannot be absolutely precise. On the contrary such precision can, and must, be the prerogative of the standard to be used in measuring the changes in relative prices arising from changes in the distribution of income, at a given technology. In looking for such a standard, Ricardo started with labour embodied, but then modified his position by introducing, as a measure of value, an abstract money "produced with such proportions of the two kinds of capital as to approach nearest to the average quantity employed in the production of most commodities"<sup>11</sup>. The final step along this route has been Sraffa's standard commodity, which is, in fact, rigorously "invariant to changes in the division of the product" in terms of its own means of production. (There is a third standard of value, which, by necessity, is even less precise than the one proposed by Smith, that is, a price index to be used as a deflator to measure the variations in the course of time of total income and of other aggregates.)

3. The heterogeneity of the two laws of returns, then, is an expression of the radically different approaches of the two great classical economists, differences that in my opinion have not been and are not properly appreciated. This heterogeneity has not only contributed to those inconsistencies of Marshall's theory of prices that Sraffa has so acutely denounced, but has also had other damaging effects on economic theory, among which we find a confusing ambiguity in regard to the boundaries between statical and dynamic assumptions.

Marshall's theory of prices belongs to partial analysis, presupposes competition and is based, at least in principle, on statical assumptions. Sraffa shows that some elements of this theory are incompatible with partial analysis, others with free competition, still others with the statical assumptions. I will consider, in particular, the inconsistencies in which the statical assumptions are involved.

The preliminary question is: can the two laws of returns be used in statical models, as, not only Marshall, but many contemporary economists still do?

<sup>11</sup> D. RICARDO, *op. cit.*, pp. 44-5.

If we consider the versions of those laws as they were proposed by the two great classical economists, the answer is necessarily No - as in a moment I will say in a greater detail.

But is it possible to modify those laws in such a way as to make that use logically acceptable without seriously altering their nature?

Here the answer must be more articulate. Before trying to give this answer, we have to give a definition, as precise as possible, of statics and dynamics - a very difficult task indeed.

A statical model is one that embodies a series of logical possibilities, independent of time; correspondingly, a statical curve represents a series of alternative hypotheses, that is, of virtual variations of the phenomena considered; reversibility is a necessary property of such a curve. A dynamic model is one in which — as has been said — quantities (and decisions) must be dated; a dynamic process is inconceivable outside time. It should be added that a stationary process is still a dynamic process, that, however, repeats itself always in the same way. (A stationary process lends easily itself to a statical analysis; in principle, however, we have to be well aware of the distinction.) A dynamic analysis tends to isolate certain groups of phenomena in order to explain their relations and their behaviour in the course of time. In this analysis time appears in a purely abstract way; when we consider it in its actual terms, that is, when we engage in an historical inquiry, then we have to record a given set of phenomena as they appear in reality, using, then, the dynamic models to interpret their behaviour.

Now, there is no doubt that for Smith the tendency to increasing returns is a dynamic process, behind which we find the division of labour. In its turn, the division of labour is the result of the growth and of the increasing differentiation of the economy as a whole and not simply of individual industries or, even less, of individual units of production. After studying the conditions and the main features of this process on an abstract plane, Smith considered its real, that is, its historical behaviour referring to different countries. Indeed, often it is difficult, not to say impossible, to separate, in the *Wealth of Nations*, the theoretical from the historical analyses; and this, if it is a tribute to Smith's realism, is also a criticism to what appears, in several points, to be a lack of rigour. Smith's increasing returns, then, represent a dynamic process. The only case of increasing returns consistent, at least in a first approximation, with statical assumptions is the case of those economies of scale that presuppose technology as given — we may call them “statical economies of scale” and call “dynamic economies of scale” those economies that depend on technological progress and that can be obtained only by firms of an increasing size. In Smith's times all kinds of economies of scale were largely absent; if anything, only the dynamic kind can be found, in an embryonic way, in the *Wealth of Nations*. Thus, it remains true that, in



Smith, the whole process of the division of labour should be considered in dynamic terms. It should be added that, today, the dynamic economies of scale are probably much more important than the statical economies.

Also Ricardo's tendency to diminishing returns properly belongs to the realm of dynamic analysis. In fact, according to Ricardo it is the increase, in the course of time, of population that calls into cultivation land of inferior quality or less advantageously situated and thus gives rise to rent. Ricardo recognized that improvements in agriculture can counteract the tendency to diminishing returns. But he believes that in the long run it is the natural tendency that is bound to prevail. The consideration of improvements in agriculture belongs, again, to the realm of dynamic, not statical, analysis. Yet, if one considers the increase of population as a virtual variation and if one neglects the improvements in agriculture by assuming that their influence is secondary, then it is not so illogical to include the tendency to diminishing returns in a statical model. Yet, as Pasinetti<sup>12</sup> has shown, the proper approach to be adopted in interpreting Ricardo in modern terms is a dynamic approach.

Marshall was worried about the problems of logical consistency between increasing returns and statical assumptions; he made considerable efforts to interpret Smith's process of the division of labour in such a way as to make it compatible with statical assumptions; the internal and the external economies are the result of these efforts. Let us consider in greater detail the two types of economies.

(1) The internal economies are those determined by large scale production, that, in its turn, is the consequence of the increase in the size of the firms. Large scale production makes possible the application of new methods and the introduction of new machines. These are new either (a) in the sense that, though already known from the technological standpoint, they were not previously used because the scale of production was not large enough, or (b) in the technological sense: the increase in the scale of production favours the subdivision of operations and thus stimulates the invention of new machines. (Only the internal economies of type (b) are, though very briefly, considered by Smith.)

(2) The external economies are those arising from the concentration of specialized industries in particular localities. Such economies do not depend necessarily on the size of individual firms; they are a special case of the economies arising from the development of the economy as a whole. The external economies, then, are (a) those due to a process of specialization favoured or determined by the geographical concentration of industries of various kinds and (b) those due to the introduction of

<sup>12</sup> L. L. PASINETTI, "A Mathematical Formulation of the Ricardian System", *Review of Economic Studies*, February, 1960, reprinted in his volume *Growth and Income Distribution. Essays in Economic Theory*, Cambridge, Cambridge University Press, 1974.

technologically new machines favoured or determined by the development of the economy as a whole. (Only the external economies of type (a) are discussed by Marshall, who gives only brief and vague hints as to the latter type of economies; in a certain sense, the opposite is true for Smith.)

It is clear that the only case of economies compatible with statical assumptions is that of economies of scale that can be achieved with a given technology (internal economies of type [a]). There can be little doubt that all the others are incompatible with those assumptions (statical economies of scale, however, are incompatible with competition as conceived by Marshall; on the other hand, external economies are incompatible not only with statical assumptions, but also with partial analysis).

Marshall discussed in a relatively long appendix (H) of his *Principles*<sup>13</sup> the "Limitations of the use of statical assumptions in regard to increasing returns". Many years later Dennis Robertson reconsidered the whole matter; owing to the importance of his observations, a relatively long quotation is justified:

It will be seen that in many of the economies of both main classes (i.e. external and internal), the element of *time* is of supreme importance. This fact has raised many doubts as to whether in such cases it is sensible to attempt to think at all in terms of a "true" or "conditional sentence" supply curve. Can we really, even if we are careful to correct for the effect of major inventions which clearly did not depend on the scale of the industry, ever hope to get beyond what is really simply an historical record of the way costs have fallen as output has risen? Certainly Marshall was very much alive — more so than several of his more mathematically minded but less mathematically competent successors — to the perils of the whole method (see V, 12, especially pp. 460-1 and Appendix H). We must, I think, concede that any curve we can construct is not perfectly reversible, i.e. that the cost per unit set against an output  $x$  should properly be less if output has shrunk to  $x$  from some higher figure  $y$  than if it has reached  $x$  for the first time, since not all the economies of specialization won in passing from  $x$  to  $y$  will be lost in passing back from  $y$  to  $x$ . And the prospect of deriving such curves with success from the confused data of real life seems to be more remote than in the case of demand curves. Nevertheless, after a period of revolt<sup>14</sup>, I am now of the opinion that the concept of a true long-period supply curve is one which we cannot do without, though we must handle it carefully<sup>15</sup>.

The most serious problems of logical consistency are those related to technical progress. Both Marshall and Robertson suggest that at least the effects of "major" innovations should be excluded from a statical supply

<sup>13</sup> A. MARSHALL, *Principles of Economics*, London, Macmillan, 8th ed., 1920, reprinted in 1949.

<sup>14</sup> Here Robertson quotes an article of his, published in January 1924 in the *Economic Journal*.

<sup>15</sup> D. ROBERTSON, *Lectures on Economic Principles*, London, Staple Press, voll. I-III, 1957-9, vol. I, pp. 118-9.

curve. We have just seen how Robertson tries to dispose of those effects (though he does not exclude other economies in spite of his recognition that the element of time is of “supreme importance” in many of them). The following is the way out suggested by Marshall:

We exclude from view any economies that may result from substantive new inventions; but we include those which may be expected to arise naturally out of adaptations of existing ideas<sup>16</sup>.

Marshall is aware of the uncertain and vague character of these considerations and warns the reader that “such notions must be taken broadly. The attempt to make them precise over-reaches our strength”. More generally, he is aware of the many problems that arise when, in constructing a static supply curve, one takes into account, among other things, of the tendency to increasing returns; but, instead of changing his approach, he tries to dodge these problems by appealing to the conditions of real life<sup>17</sup> or by emphasizing the “imperfections of our analytical methods”<sup>18</sup>. Thus, in spite of all the warnings and caveats, both Marshall and Robertson conclude that increasing returns can, after all, be considered in a static long-run supply curve. And yet those warnings are so serious that the only correct conclusion would have been to reject the long-period supply curve. It seems that those warnings are put forth only to exorcize the ghost of inconsistency — which remains there.

4. Marshall was much more worried about the problems of logical consistency arising from increasing returns than about those arising from diminishing returns; and the same applies to his successors, like Robertson. Yet, Sraffa’s criticism — that diminishing returns cannot be invoked for constructing a supply curve of an individual industry since they are incompatible with partial analysis — seems irrefutable. Sraffa concluded his 1925 article<sup>19</sup> that only constant costs are compatible with static competitive conditions. In his 1926 article<sup>20</sup> he emphasized that, in fact, a great number of commodities and the majority of manufactures are produced at decreasing costs and suggested “to abandon the path of free competition and turn in the opposite direction, namely, towards monopoly”<sup>21</sup>. As Roncaglia has pointed out, however<sup>22</sup>, Sraffa, probably

<sup>16</sup> A. MARSHALL, *op. cit.*, p. 381.

<sup>17</sup> *Ibid.*, p. 382.

<sup>18</sup> *Ibid.*, p. 667.

<sup>19</sup> P. SRAFFA, “Sulle relazioni tra costo e quantità prodotta”, *Annali di Economia*, vol. II, 1925.

<sup>20</sup> P. SRAFFA, “The Laws of Returns under Competitive Conditions”, *Economic Journal*, December 1926.

<sup>21</sup> *Ibid.*, p. 542.

<sup>22</sup> A. RONCAGLIA, *Sraffa and the Theory of Prices*, New York, Wiley, 1978, p. 14.

after a period of uncertainty, came to the conclusion that the two suggestions could not amend and thus salvage the Marshallian theory, with its apparatus of supply-and-demand curves. Indeed, a few years later, that is, in the 1930 symposium on increasing returns, Sraffa stated quite clearly that in his opinion that theory should be discarded. We now know, from the Preface of *Production of Commodities*<sup>23</sup>, that the main propositions put forth in this book had taken shape even before 1930. It seems that Sraffa was already convinced that the problem could not be solved satisfactorily at the level of partial analysis, but only at the level of general analysis, by adopting, however, not Pareto's point of view, but the classical point of view, that is, by conceiving the economic activity not as an arch, but as a circle or, better, as a spiral.

Yet, the thesis that in competitive conditions we have to assume, in a first approximation, constant returns is a valid one. In our times competitive conditions are largely restricted to agriculture and to a small number of manufactures; in the majority of industrial productions, as well as in the majority of services, noncompetitive conditions are the rule, either because of the process of concentration, associated with dynamic economies of scale, or because of the process of product differentiation, related to the rising standard of living and all sorts of sales efforts and advertising, or for both reasons.

It is fitting to point out, however, that for the classical economists — and here there is no difference between Smith and Ricardo — competition is a dynamic process, characterized by free entry and therefore, considering the economy as a whole, by a tendency towards a single rate of profit. For the marginalist economists, competition is a situation characterized by a great number of small firms, the output of each firm being so small that its variations cannot affect the price. In his 1925 article, Sraffa mentions this definition of competition and quotes Pareto<sup>24</sup>; since his main purpose is to criticize the traditional model of competition, he does not enter into a comparison between the classical and the marginalist conceptions. Yet, if we want to develop positively some of his critical hints, we would be better advised to adopt the classical conception. This is advisable, if we accept the suggestion mentioned above concerning the element of monopoly that we find in a great number of productions, especially in manufacturing. In this connection, the works of Joan Robinson<sup>25</sup> and

<sup>23</sup> P. SRAFFA, *Production of Commodities by Means of Commodities. Prelude to a Critique of Economic Theory*, Cambridge, Cambridge University Press, 1960.

<sup>24</sup> P. SRAFFA, "Sulle relazioni tra costo e quantità prodotta", *op. cit.*, p. 309. (The reference is to V. PARETO, *Cours d'économie politique*, para 46 and footnote.)

<sup>25</sup> J. ROBINSON, *The Theory of Imperfect Competition*, London, Macmillan, 1933.

Edward Chamberlin<sup>26</sup> are often mentioned. It should be observed, however, that these works meet only one of Sraffa's criticisms: basically, they do not depart from the marginalist tradition. Kalecki's works, especially those published in 1938<sup>27</sup> and 1943<sup>28</sup>, are much nearer to Sraffa's point of view which conceives the widespread monopoly elements in terms of obstacles to entry and are in many ways akin to the classical conception.

From the 1926 article the following picture emerges clearly: many firms, especially in manufacturing, in the short run produce at constant marginal costs and, correspondingly, at falling total costs per unit; in the long run, again, total costs per unit are falling. This is precisely the behaviour of costs that Kalecki assumes in his 1938 and 1943 articles, in both of which he presents interesting empirical tests that embody those assumptions. And this is exactly the picture that emerged, first of all, from the empirical inquiry conducted by Hall and Hitch<sup>29</sup> and other economists in Oxford and, subsequently, by a great number of investigations, whose results are very carefully collected by Edwin Mansfield<sup>30</sup>. It should be observed that the impressive list of findings that, almost all, agree with the picture sketched by Sraffa and are in sharp contrast with the picture presented by traditional theory — which assumes that, after a point, both short-run and long-run marginal costs are rising — does not shake Mansfield's faith in the traditional curves — an interesting illustration of the persuasive (I should say, hypnotic) power of a theoretical paradigm, that can blind us even to the most evident facts. It is to be observed, too, that the picture sketched by Sraffa is wholly consistent with the findings presented by John G. Dunlop<sup>31</sup> in 1938 to show that the belief expressed by Keynes in his *General Theory*<sup>32</sup>, that when money wages are rising real wages tend to fall, is unfounded — a belief that as Keynes pointed out in

<sup>26</sup> E. H. CHAMBERLIN, *The Theory of Monopolistic Competition*, Cambridge Mass., Harvard University Press, 5th ed., 1947.

<sup>27</sup> M. KALECKI, "The Determinants of the Distribution of Income", *Econometrica*, April 1938, reprinted in his *Selected Essays on the Dynamics of the Capitalist Economy 1933-70*, Cambridge, Cambridge University Press, 1971; "The Principle of Increasing Risk", in his *Essays in the Theory of Economic Fluctuations*, London, Allen and Unwin, 1938.

<sup>28</sup> M. KALECKI, "Costs and Prices", in *Studies in Economic Dynamics*, London, Allen and Unwin, 1943, reprinted in *Selected Essays*, *op. cit.*

<sup>29</sup> R. L. HALL and C. J. HITCH, "Price Theory and Business Behaviour", *Oxford Economic Papers*, May 1939, reprinted in T. W. WILSON and P. W. S. ANDREWS (eds.), *Oxford Studies in the Price Mechanism*, Oxford, Oxford University Press, 1952.

<sup>30</sup> E. MANSFIELD, *Microeconomics. Theory and Application*, New York, W. W. Norton, 1975, tab. 6.4 and fig. 6.2.2.

<sup>31</sup> J. G. DUNLOP, "The Movement of Real and Money Wage Rates", *Economic Journal*, September 1938.

<sup>32</sup> J. M. KEYNES, *The General Theory of Employment, Interest and Money*, London, Macmillan, 1936, p. 10.

his reply to Dunlop's criticism "was widely held by British economists"<sup>33</sup> and was implicit in the view that, after a point, marginal costs tend to rise when output expands. Today in most empirical and econometric analyses of prices short-run marginal costs implicitly or explicitly are assumed to be constant (and therefore equal to direct costs) at least, as is usually added to avoid controversies, "in the relevant range of output".

It is important to notice that, once we abandon the statical framework, the monopoly elements do not appear any more necessarily as a source of waste or as an obstacle to growth. Sraffa emphasizes that the limit to output expansion is, as a rule, not to be found within the individual firm, as the traditional theory suggests (the limit being given by a rising marginal cost), but in demand. This thesis is worth reflection: it implies that, provided demand increases, output can expand and, as a rule, can expand even at decreasing costs. It becomes important, then, to study the conditions that make possible a widespread increase in demand — a question that in many ways is related to the much wider problems of the management of aggregate demand, discussed by Keynesian and post-Keynesian theories.

From Sraffa's 1926 article other suggestions, in my opinion, are still to be developed. Thus, Sraffa points out that the limits to bank loans that a given firm can obtain are due, not simply, or not at all, to the level of the rate of interest, but to the fact that it is known that that firm is unable to increase its sales outside its own particular market without incurring heavy marketing expenses. Now, this issue could be usefully discussed in connection with Kalecki's "principle of increasing risk" to explain the distribution between internal and external means devoted to the financing of the investment of the firms. In fact, this important problem has not yet been adequately explored.

5. In the conception of the marginalists, including Marshall's, the fundamental problem of economic theory is to find the conditions of equilibrium and, in particular, the equilibrium prices, determined by demand and supply curves — each price appearing as the keystone of an arch. In the classical conception the fundamental problem is to find the conditions of reproduction of the system.

In *Production of Commodities* Sraffa works out a rigorous formalization of the classical conception. He assumes an annual cycle of production and an annual market and studies the conditions of reproduction of this cycle. Such conditions are represented, first of all, by that "set of exchange-values which, if adopted by the market, restores the original distribution of the products and makes it possible for the process to be

<sup>33</sup> J. M. KEYNES, "Relative Movements of Real Wages and Outputs", *Economic Journal*, March 1934, p. 34.

repeated; such values spring directly from the methods of production”<sup>34</sup>.

In sharp contrast with the traditional theory, then, Sraffa conceives the prices of production as directly determined by the methods of production: there is no room for demand and supply curves and for their intersection. In this respect, however, the distinction between basic and non-basic commodities has a special relevance, since the prices of the former contribute to determine the general price system and the rate of profits, whereas non-basic commodities are passive: their prices are determined by the methods of production as well as by the prices of basic commodities but they do not contribute to determine the price system and the rate of profits (or the rate of wages if the rate of profits is taken as the independent variable)<sup>35</sup>. Non-basic commodities enter into the surplus: in a given productive cycle, the surplus is free and the commodities constituting it have no role in reproduction. This poses the problem of the quantities of such commodities to be produced: since these are not determined by the necessities of reproduction, they are produced in relation to the possibilities of selling them; such possibilities depend on the preferences of the consumers, originating, in their turn, not in the psychology of the individuals, considered among the ultimate data, but from the stage and the type of development of the society as a whole. This is a problem of demand, which is very different from the problem of demand of traditional theory and which does not contradict at all the logical framework of Sraffa’s model: the fundamental role in price determination always belongs to the technology of basic products. This question enters into the wider question of the different uses of the surplus.

Sraffa’s model is a dynamic one, in the sense previously defined; it represents a stationary economy. In fact, it is a model worked out not to study a growth process, but, fundamentally, to explain how relative prices change when the income distribution varies — exactly the problem in which Ricardo was mainly interested; moreover, that model presupposes competition since it assumes a single rate of profit. Those who intend to use Sraffa’s model to analyze a growth process under both competitive and noncompetitive conditions should introduce several important modifications; these, however, can be such as not to alter its logic (Pasinetti’s suggestion of adopting a vertically integrated sectorial analysis<sup>36</sup> repre-

<sup>34</sup> P. SRAFFA, *Production of Commodities*, *op. cit.*, p. 3.

<sup>35</sup> Without fully realizing it, in the second part of my monograph on oligopoly, in which I tried to proceed from the partial analysis of the first part to a very simplified form of general analysis, I came across with non-basic products having the characteristics mentioned in the text (P. SYLOS LABINI, *Oligopoly and Technical Progress*, Cambridge Mass., Harvard University Press, 2nd ed., 1969, p. 143, footnote 15).

<sup>36</sup> Cf. L. L. PASINETTI, *Sraffa’s Circular Process and the Concepts of Vertical Integration*, unpublished, paper presented at the Conference on “Sraffa’s *Production of Commodities by Means of Commodities* after 25 Years”, Florence, August 1985.

sents a line that seems to be complementary and not in contradiction with that of Sraffa). Noncompetitive market forms can easily be introduced by exploiting the possibility of considering the rate of profit, or a range of profit rates, as an independent variable. Even the consideration of a growth process at constant inputs is easy, although the constancy of inputs does not exclude at all technical progress but, on the contrary, presupposes innovations capable of counteracting exactly the tendency to diminishing returns from land and from mines<sup>37</sup>. Naturally, in such an analysis it would be necessary for at least a part of the surplus to be used productively, i.e. accumulated: the maximum rate of growth would depend on the availability of the surpluses of the basic products — the minimum surplus would fix the limit to growth. If even one of the basic products only were to be produced without surplus, then reproduction would be possible, but not growth. (The surplus can consist both of basic and non-basic commodities: the latter can only be consumed, as hinted above, whereas in the case of basic commodities the alternative is between productive and non-productive uses.)

If we introduced the hypothesis that a part of the surplus of a given period were to be used to produce additional means of production of a new type — for instance, technologically new machines — then, we would analyze a process of growth propelled by a technical progress corresponding to that most frequently observed in reality. At this point considerable difficulties arise, since changes in the methods of production imply changes in the standard system, if basic commodities are involved (Sraffa discusses the case of the switch in the methods of production of one of the commodities in chapter XII of *Production of Commodities*). However, in analyzing a process of growth the main problem becomes that of measuring the changes in the value of individual commodities in the course of time, so that we can put aside the problem of the changes in relative prices depending on changes in income distribution (Ricardo's problem) and use Smith's standard, i.e. labour commanded. In any case, it

<sup>37</sup> Many years ago, in 1968, to criticize a view that at that time was gaining ground among the young members of the Institute of Economics of the Faculty of Statistics of Rome, in a seminar I presented a paper (P. SYLOS LABINI, *Introduzione di forme di mercato non concorrenziali nello schema di Sraffa e passaggio alla riproduzione su scala allargata: appunti preliminari e provvisori*, Roma, Istituto di Economia della Facoltà di Scienze Statistiche, Settembre 1968, mimeo), intended to show: (a) how non-competitive market forms could be introduced into Sraffa's model and (b) how, in a first approximation, a growth model could be examined on the basis of the said model. Although that paper had some circulation in a mimeographed form, I did not publish it; I only summarized the first section, concerning noncompetitive market forms, in my "La théorie des prix en régime d'oligopole et la théorie du développement", *Revue d'économie politique*, Mars-Avril 1971, then reproduced, with modifications, in my recent volume *The Forces of Economic Growth and Decline* (Cambridge Mass., The M.I.T. Press, 1984). The reason is that I intended to develop and enlarge my rudimentary analysis of a growth process by considering also the case of changes in inputs due to technological progress; but for several reasons since then this remained only a project.



is as well to remember that there are several models that, although not deliberately or formally linked to that of Sraffa, yet, are fully consistent with the classical approach. As far as Sraffa's model is concerned, the view has hitherto prevailed that it was necessary to develop first of all the implications of the pure model, deliberately avoiding other analytical developments — like the one concerning technical progress and growth — that would create dangers of confusion. As far as I was able to understand, Sraffa himself had an attitude of this type. I think that such an attitude, fully justified twenty or even ten years ago, now-a-days needs to be reconsidered; the conclusion will probably be reached that there is room for both kinds of analytical works, the development of the theoretical problems of the original model and the consideration of the most appropriate way to use it in order to examine the essential features of a growth process, which, after all, directly or indirectly was the main concern of the classical economists.

## Appendix I

### ON SMITH'S ALLEGED CONFUSION BETWEEN LABOUR EMBODIED AND LABOUR COMMANDED

#### 1. The two standards: difference and equivalence

To make clear why the two standards as a rule give different results, when considering the exchange ratios between different commodities in a given moment and under which conditions they are equivalent in the intertemporal comparisons of value of the same commodity, we might consider a simple numerical example, beginning with the first question — exchange ratios between different commodities.

If the production of commodity *A* requires one hour of labour, whereas commodity *B* requires two hours, then, according to labour embodied the two commodities should exchange according to the ratio 2 to 1 (2 units of *A* for 1 unit of *B*). However, if, for reasons related to non-labour inputs, that is, to the techniques of production, the share of wages per unit on price (let us call it  $\gamma$ ) in *B* is twice that in *A*, then the two commodities will command the same labour and the exchange ratio so measured would be 1 to 1.

If we call *H* labour embodied in one unit of a given commodity, *P* the price of the same commodity, *W* the wage rate, we have

$$\gamma = WH/P \quad \text{or} \quad P = WH/\gamma$$

According to labour embodied the exchange ratio between the two commodities is

$$H_B/H_A = 2 \text{ (two units of } A \text{ for one unit of } B\text{)}$$

According to labour commanded the exchange ratio is

$$\frac{P_A/W}{P_B/W} = 1$$

This is so because

$$P_A/W = H_A/\gamma_A = 1/0.25 = 4$$

$$P_B/W = H_B/\gamma_B = 2/0.50 = 4.$$

A similar reasoning and a similar example can illustrate why the two standards — the wage share remaining stable — are equivalent in the intertemporal comparisons of value of the same commodity<sup>38</sup>.

## 2. The relative stability of the wage share in Smith

Although the assumption that the wage share remains stable in the course of time is not explicitly made by Adam Smith, it seems to be consistent with his views as to what happens in the progressive state of a country's evolution. Indeed, according to Smith when the wealth of a nation increases, the share of rent tends to increase and the share of profits tends to decrease, leaving relatively stable — so it seems — the share of wages. As for profits, Smith speaks of a decline of their rate, not of their share; however, considering that, for him, the principal part of capital is given by the goods for the consumption of the labourers and, in any case, assuming, as is reasonable, that total capital and national income increase in the same proportion, then the share and the rate of profits tend to behave in the same way.

The following specific quotations can be of help.

(a) Rent: "The landlord's share of the produce necessarily increases with the increase of the produce"<sup>39</sup>.

<sup>38</sup> I worked out the above argument in my report to the Glasgow Conference for the Bicentenary of the *Wealth of Nations*, recently reprinted in my *The Forces of Economic Growth and Decline*, *op. cit.*; see Part 1, ch. 1, sec. 3.

<sup>39</sup> A. SMITH, *op. cit.*, ch. XI, p. 275.

(b) Wages: "It is not the actual greatness of national wealth, but its continual increase, which occasions a rise in the price of labour"<sup>40</sup>.

(c) Profits: "... the rate of profit does not, like rent and wages, rise with the prosperity, and fall with the declension, of the society. On the contrary, it is naturally low in rich, and high in poor countries"<sup>41</sup>.

The above remarks and quotations are concerned with the overall shares of the three categories of incomes. As for the individual commodities, the shares can be different from the overall shares, but the trends are not necessarily different. In fact, even in those commodities in which the increases of productivity are particularly rapid, as in the great majority of manufactures, both the absolute and the relative prices can vary considerably, but the share of wages can remain relatively stable; in such branches wages can increase without pushing up the share of wages if the changes in relative prices are proportional to the changes in the cost of labour per unit of output<sup>42</sup>.

Smith's assumption will not seem so far-fetched if one thinks of the vast literature that aims to explain the relative stability of the wage share over national income pointed out by several statisticians with reference to a very long period — say for the hundred years preceding the Second World War.

### 3. Ricardo

I will limit myself to what I consider the most important statements:

"Adam Smith, who so accurately defined the original source of exchangeable value, and who was bound in consistency to maintain, that all things became more or less valuable in proportion as more or less labour was bestowed on their production, has himself erected another standard measure of value, and speaks of things being more or less valuable, in proportion as they will exchange for more or less of this standard measure. Sometimes he speaks of corn, at other times of labour, as a standard measure; not the quantity bestowed on the production of any object, but the quantity which it can command in the market: as if these were equivalent expressions, and as if because a man's labour had become doubly efficient, and he could therefore produce twice the quantity of a commodity, he would necessarily receive twice the former quantity in exchange for it"<sup>43</sup>.

<sup>40</sup> *Ibid.*, ch. VIII, p. 78.

<sup>41</sup> *Ibid.*, ch. XI, p. 277.

<sup>42</sup> Cf. the quotation at the end of section 4 of this Appendix.

<sup>43</sup> D. RICARDO, *op. cit.*, pp. 13-4.

#### 4. Marx

“Many examples can be given to show how often in the course of his work, when he is explaining actual facts, Smith treats the quantity of labour contained in the product as value and determining value. Some of these are quoted by Ricardo. His whole doctrine of the influence of the division of labour and improved machines on the price of commodities is based on it. Here one passage will be enough to cite. In ch. XI, 1. I Adam Smith speaks of the cheapening of many manufactured goods in his time, as compared with earlier centuries, and he concludes with the words:

It cost a greater quantity of labour to bring the goods to the market. When they were brought thither, therefore, they must have purchased, or exchanged for the price, of a greater quantity<sup>44</sup>.

(...) [T]his contradiction in Adam Smith and his passing from one kind of explanation to another is based upon something deeper, which Ricardo, in exposing this contradiction, overlooked or did not rightly appreciate, and therefore also did not solve”<sup>45</sup>. (Here Marx goes on to discuss certain aspects of labour embodied.)

At the beginning of the above quotation Marx states that one can find several examples of the said “contradiction”. No doubt, another of such examples that, given its importance, is worth quoting, is the following one:

“It is the natural effect of improvement (...) to diminish gradually *the real price* of almost all manufactures. (...) In consequence of better machinery, of greater dexterity, and of a more proper division and distribution of work, all of which are the natural effects of improvement, *a much smaller quantity of labour becomes requisite* for executing any particular piece of work: and though, in consequence of the flourishing circumstance of the society, the real price of labour should rise very considerably, yet the great diminution of the quantity will generally much more than compensate the greatest rise which can happen in the price”<sup>46</sup>.

Even in the above passage we find the “confusion” that we are discussing, since by “real price” Smith means invariably labour commanded and since the “quantity of labour” cannot refer but to labour embodied. From this and from several other passages it is clear that, in the intertemporal comparisons of value, Smith considers the two expressions

<sup>44</sup> [A SMITH, *op. cit.*, ch. XI, p. 273].

<sup>45</sup> K. MARX, *Theories of Surplus Value*, London, Lawrence and Wishart, 1963 (reprinted in 1969 and 1975), part I, ch. III, p. 71.

<sup>46</sup> A. SMITH, *op. cit.*, ch. XI, p. 269 (italics added).

as equivalent. As is argued in the text, however, this is neither a confusion nor an error.

Why, then, in the said comparisons is Smith reasoning in terms of labour embodied rather than in terms of labour commanded?

Because the changes in the “productive powers of labour” in the course of time are measured by the changes in labour input, i.e. by labour embodied; but the only practical way to measure these changes is to follow the changes in the ratio  $P/W$ , i.e. labour commanded, granting that the assumption of a stable wage share can be taken as sufficiently realistic. In fact, the data of labour embodied are extremely difficult to find, whereas those of prices and wages as a rule are easy to find (if the data of wages are not available, then Smith suggests to using the price of corn as a substitute). Thus, in the intertemporal comparisons labour commanded cannot be dispensed with and the said procedure seems to have no alternative.

In short: labour embodied is the standard to be used in intertemporal comparisons, but, for practical reasons, labour commanded is to be adopted; the latter is the only standard to be used for the exchange ratios.

## Appendix II\*

### THE EXTENSION OF SRAFFA'S MODEL TO THE ANALYSIS OF GROWTH PROCESSES

Soon after the publication of *Production of commodities* two opposite dangers became evident. One was that young and impatient economists would have tried to apply prematurely Sraffa's model to the problems of the real world; the other danger was that of concentrating most of the efforts to the defense of the basic approach (which was the classical one) against the foreseeable attacks of the marginalists and to the development of the model on the same highly abstract plane, thus giving rise to the idea that Sraffa's model was good only for pure theorists; in such a case, the problems of the real world have remained largely under the influence of traditional economists (in his comment to my paper Professor Groenewegen<sup>47</sup> points out precisely this situation, with reference to the problems of taxation).

Today, after 25 years, we can say that the first danger has been avoided, but not the second, in spite of several important works, some of them presented at this Conference.

\* This second Appendix has been added after the Conference was concluded.

<sup>47</sup> P. GROENEWEGEN, *Sraffa's Criticism of the Marshallian Theory of Prices. A Comment on the Paper by Professor Sylos Labini*, unpublished, presented at the Conference on “Sraffa's Production of Commodities by Means of Commodities after 25 Years”, Florence, August 1985.

Among the most relevant problems of the real world we find those connected with growth processes. The first step to use Sraffa's model in the analysis of such processes, that is, the analysis of proportional growth, is very easy — the limit to such a process being given by the relatively scarce basic commodity entering into the surplus. The problems concerning technical progress, the change in the composition of output, the increase in fixed capital and in capacity utilization: all such problems imply considerable difficulties. But as Pasinetti already in the past and Schefold in this Conference have shown, such difficulties are not insurmountable. The road in front of us, however, is a long one.

Without thinking of impossible marriages between Sraffa and Keynes, it is perfectly possible to make use of the two analyses in a complementary way; but this can be done only after at least the preliminary steps along the path of growth analysis have been made. In fact, the problems of effective demand become relevant precisely in the analysis of growth processes and not in the first approximation, where all quantities are given and reciprocally compatible.

Eatwell's observation<sup>48</sup> that we have to distinguish between endogenous and exogenous impulses to the expansion of effective demand is worthy of reflection — technological innovations being the most important endogenous impulse, State expenditure the most important exogenous stimulus. As for the latter, we have to recognize that both Keynes and the Keynesians have neglected two interrelated problems: that of the optimum rate of expansion of total public expenditure and that of the optimum distribution between productive and unproductive expenditure — the former being a special kind of investment, the latter including two important categories of expenditure, one relating to social welfare, the second to military activities. In its turn, the problem of public expenditure is related to that of public receipts, that is, of taxation. In my view, it is perfectly possible to analyze public expenditure and taxation in a "Sraffa type" of model.

In our time the models that are logically compatible with the classical approach and, therefore, with Sraffa's analysis are quite a few, though the relations are not always obvious. Yet, I believe that if we work out models that adopt the classical approach *and* make use of Sraffa's analysis we can make further important theoretical progress.

*Dipartimento di Scienze Economiche, Università di Roma.*

<sup>48</sup> J. EATWELL, *Notes on Effective Demand and Accumulation*, unpublished, paper presented at the Conference on "Sraffa's Production of Commodities by Means of Commodities after 25 Years", Florence, August 1985.