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surplus approach to value and distribution.

1. INTRODUCTION. When we look back over two centuries of economic analysis we find that we can distinguish two successive approaches to the theory of distribution and relative prices. The modern approach was preceded by one which had at its centre a notion of 'social surplus'. This earlier 'classical' or 'surplus' approach, as it has been called, had its beginnings with writers like William Petty and Richard Cantillon, found its first systematic expression in Quesnay's *Tableau Economique* of 1758, became dominant with the classical economists from Adam Smith to Ricardo, and was then taken over and developed by Marx at a time when the main stream of economic analysis was already moving in a different direction.

The purpose of this essay will be to present the basic elements of this approach and consider its central analytical part concerned with the determination of relative prices and the rate of return on capital. Here, the surplus approach will not be examined only from the angle of the history of economic thought, but also from that of the possibilities it may open for contemporary theorizing. Thus we shall also concern ourselves with the resumption of the surplus approach at the hands of Sraffa and of other authors in recent years – in parallel with the emergence of difficulties within the dominant demand-and-supply approach.

Part I of this essay examines the premises that characterize the surplus approach (section I) and then proceeds (section II) to compare the analytic structure of that approach with that of later theory. Finally, the third section will deal with the influence of demand conditions on prices in the classical as distinct from the 'neoclassical' approach – which we shall refer to as the 'marginal' or 'marginalist' approach. This qualification appears in fact to be more appropriate, given the basic role which substitutability between goods and factors, and hence 'margins', plays in it, and its profound difference from the classical approach (the reader who so prefers can however safely replace 'marginal' or 'marginalist' with 'neoclassical' whenever he finds the former adjectives in the present essay; on the origin of the expression 'neoclassical' economics and its shortcomings, see the entry 'NEOCLASSICAL').

Part II, on the other hand, examines the difficulties which the development of the classical approach has raised in connection with the determination of the rate of profits and of relative prices – difficulties which, as will be seen, proved easy to overcome in later years, but at the time played an important part in the progressive obfuscation and abandonment of the approach. Thus the first of these (section IV) deals with the role of the labour theory of value in the development of the classical approach and with the problems that theory left unsolved. The two remaining sections deal with the solution to

those difficulties provided in the context of the contemporary resumption of the classical approach. In particular, section V shows how Sraffa's solution in terms of the system of price equations directly follows from the development of Marx's theory of prices of production. Section VI examines the solutions which can be provided by the 'surplus equation method' founded on the integrated wage-goods sector, or else, under Sraffa's partially different hypotheses about the wage rate, on the Standard system.

PART I: THE ANALYTICAL STRUCTURE OF THE CLASSICAL THEORIES

SECTION I. WAGES AND THE SURPLUS.

2. *The concept of surplus.* The concept of social surplus characteristic of the classical theories can perhaps be seen in its simplest form in Quesnay's *Tableau Economique*. Quesnay saw that if the social product – which he considered to consist entirely of agricultural commodities – was to reproduce itself year after year without increase or diminution, a part of it had to be put back into production. Besides the necessary replacement of the means of production, this part included the subsistence of the agricultural labourers. What remained of the annual product after deducting this part constituted a 'surplus', or '*produit net*', of which society could dispose without impairing the conditions of its survival.

The fact that the subsistence of workers was considered necessary for reproduction established a direct link between this analysis of reproduction and that of the division of the product among the classes into which society is divided. Thus Quesnay linked the surplus with the landowners' share of the social product. And when Smith extended Quesnay's notion of surplus by showing that surplus originated from production in general and not from agricultural production alone, profits emerged as a second component of the surplus alongside the rent of land, thus providing the basis for the theory of distribution of the classical economists down to Ricardo.

The determination of the size of the social surplus was accordingly the centre around which these theories revolved. In principle this way of determining the non-wage incomes is simple. Three sets of circumstances are assumed to be known prior to this determination (on this choice of data, see, in particular, Garegnani, 1960, Part I, ch. 1; Eatwell, 1977, p. 62):

(i) the real wage: that is, the quantities of the several commodities constituting the wage rate (for the possibility of assuming a single 'normal' wage, and thus homogeneous labour, see the assumption by these authors of a sufficient persistence of the ratios between the normal wages for labour of different qualities: Ricardo, 1951–73, I, pp. 20–38; Smith, 1776 vol. I, Bk. I, ch. x, p. 130; on this issue see also Garegnani, 1984, p. 293, n.5);

(ii) the social product: that is, the output of the commodities produced in the year;

(iii) the technical conditions of production.

On the other hand a known social product and known technical conditions imply a known number of labourers employed. (For simplicity, we are here assuming that each commodity can be produced by means of one method only, but alternative methods of production could easily be introduced. Keeping to a given physical social product one could let the employment of labour in Figure 1 depend on the wage rate; on the assumption of given outputs in the face of changes in wages and employment, cf. par. 9 below). By multiplying the number of labourers employed by the known physical wage, we obtain the share of the product that goes to

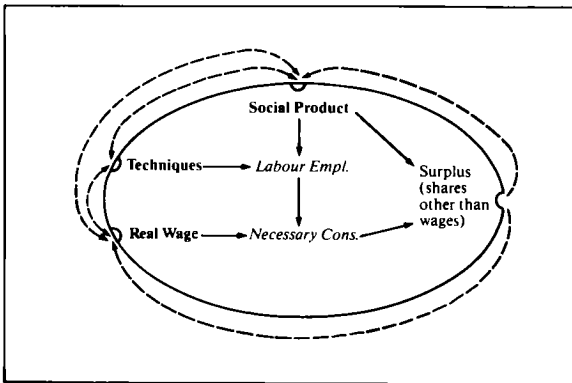


Figure 1 A diagram of the 'core' in the surplus theories. Bold-face distinguishes circumstances determined outside the core. Continuous arrows point to dependencies studied inside the core; discontinuous arrows indicate influences studied outside the core.

the labourers and which, for brevity, we may call 'necessary consumption' (Ricardo, 1951-73, VI, p. 108).

The surplus, that is, the share of the product that goes to classes of society other than labourers, is then determined as the residual obtained by subtracting the necessary consumption from the social product (taken here, for simplicity, net of the replacement of means of production). We have therefore:

$$\text{Social product} - \text{Necessary consumption} = \text{Shares other than wages (Surplus)} \quad (1)$$

an equation where 'shares other than wages' is the only unknown (cf. also Figure 1), and which encloses the underlying logic of the theory, whatever the mathematical form the determination of the 'shares other than wages' may then take: the 'simultaneous price equations' of Sraffa or, the 'surplus equation' of Ricardo, Marx, or those we shall see in section VI below.

Thus the peculiar feature of these theories, the determination of the shares of the product other than wages as a residual or 'surplus' - has its logical basis in the consideration of real wage and social product as being determinable *prior to those shares*. It is to the determination of the real wage and the social product, therefore, that we must turn however briefly for an understanding of the *substance* of these theories, as distinct from the *formal aspect* concerning the choice of independent variables in equation (1).

3. *The determination of real wage and social product.* Ricardo and Quesnay envisaged the wage as determined by 'subsistence' - the level, that is, that will ensure the reproduction of workers and the repetition of the social process of production. In assessing their views in this respect it is however important to notice that they considered this subsistence to be determined by historical, rather than physiological conditions.

Adam Smith's position regarding the average, or 'natural' wage, on the other hand, was more complex and in some respects more interesting than that of Ricardo. He did not directly explain the tendency of wages to a historical subsistence level by some tendency of the population to grow in excess of the possibility of employment offered by accumulation. He explained that tendency by the advantage which 'the masters' have in disputes over wages. Thus, for example, Smith noted how the 'masters' could 'hold out' much longer than the workers in all wage disputes, since the master's 'necessity' for the workman is not so 'immediate' as the

workman's for his master (Smith, 1776, Bk. I, ch. viii, pp. 58-64).

Marx, for his part, was also far from adhering to a simple theory of wages based on subsistence. He asserted that the 'regulating average wage' is given by a historically determined level of subsistence, but the tendency to this 'average wage' was the result of a complex interaction between the actual wage and the size of the 'industrial reserve army' of unemployed labour. This mechanism gave considerable flexibility to his position on the long-term evolution of the 'average' wage. So, for example, in *Capital* (1867, vol. I, ch. xxv, p. 580), Marx states that the real wage can rise in the long run to the extent in which the corresponding 'diminution of the unpaid labour ... would [not] threaten the [capitalist] system itself'.

Thus, it appears that what all these authors had in common was not, as is often held, the idea of a wage determined by subsistence (cf. e.g. Samuelson, 1971, pp. 414, 423). It was the more general notion of a real wage governed by conditions (often of a conventional or institutional kind) that are *distinct* from those affecting the social product and the other shares in it, and are therefore best studied *separately* from them. This separation between the determination of the wage and that of the social product is evident when, as in Quesnay or Ricardo, the wage is explained in terms of a customary subsistence. But the same separation between the two questions emerges in Smith and Marx who admitted a greater influence of current economic phenomena on the real wage. It is this separate determination of the real wage that entails the treatment of the latter as a known magnitude when the determination of the other shares of the product is approached (cf. e.g. Marx, 1905-10, vol. I, p. 45: on the different interpretation of the classical theory of distribution indicated as the 'canonical classical model' cf. Hicks and Hollander, 1977; Samuelson, 1978; Casarosa, 1978; for a critical comment on that interpretation, cf. Garegnani, 1983, p. 311).

As for the physical social product, the circumstances that were seen to determine it were also such that it was natural to suppose the product to be known prior to its division among the classes. In fact, if we attempt to reduce analyses as different as those of Quesnay, Smith, Malthus, Ricardo or Marx to their common basic elements, what we find is the view that the *volume* of the social product depends on:

(i) the stage reached by accumulation, which governs the number of 'productive' labourers employed (where the process of accumulation was seen by some classical authors like Malthus and Marx not to be independent of aggregate demand);

(ii) the technical conditions of production which regulate the physical product per labourer and depend in turn on the stage reached by accumulation (see Smith, 1776, vol. I, pp. 1-2).

The *commodity composition* of the social product, on the other hand, was studied mainly from the angle of the needs of reproduction (see, for example, Quesnay's *Tableau Economique* or Marx's reproduction schemes in chapters xx-xxi of vol. II of *Capital*).

These views on the forces determining wages and outputs are what led to their separate determination and thus to reckoning the non-wage shares as the residual of equation (1) - that is, as the difference between (net) social product and necessary consumption.

SECTION II: SHORT CHAINS OF DEDUCTIVE REASONING.

4. *The 'core' of classical theories.* It is important to notice now how that *separate* determination of the real wage and social

product entails a structuring of the analysis which is radically different from that of the theories which were to become dominant later. The surplus theories have, so to speak, a *core* which is isolated from the rest of the analysis because the wage, the social product and the technical conditions of production appear there as already determined. It is in that 'core' that we find the determination of the shares other than wages as a residual – a determination which, as we shall see in Part II, will also entail the determination of the relative prices of commodities. There we shall find, more generally, an analysis of the relations between, on the one hand, the real wage, the social product and the technical conditions of production (treated as the *independent* variables) and, on the other hand, the 'shares other than wages', constituting the surplus, and the relative prices (treated as the *dependent* variables).

However, this treatment of real wages, social product and technical conditions of production as independent variables in the 'core' in no way entailed a denial of the existence of influences of any single one of these three sets of 'independent' variables upon the other two, nor did it imply the denial of influences which prices and the shares other than wages could have upon any of the three 'independent' variables of the core. This treatment only implied a study of these influences which was *separate* from, and not simultaneous with, the examination of the relationships characteristic of the 'core'.

Let us look at this basic point in some greater detail. The interaction between the three independent variables of the 'core' was freely admitted by the classical economists and by Marx. An example is Marx's discussion of the 'realization' of surplus value, in which the real wage played a key role in the determination of the size of the social product (cf. e.g. Marx, 1905–10, vol. II, pp. 492–4). Another example is the influence which a greater speed of growth of the social product was seen by all classical economists to have in raising the real wage. Likewise admitted were reactions of the surplus (profits and rents) and of relative prices upon one or other of the above three independent variables. For example, the classical economists generally admitted the influence of the rate of profits on the real wage, via the speed of accumulation, as just mentioned. Marx went further by considering how a fall of the rate of profits, consequent upon a rise of the wage rate, would check accumulation and cause technical change, thus re-creating a level of labour unemployment sufficient to reverse the initial wage rise. And the examples could easily be multiplied.

What the structure of classical analysis did imply was something different from ignoring all those relations. It was that – like the action of any other factor that determine wages, social product and available techniques – these interactions and reactions were left to be studied outside the 'core' just described. This separate study was the natural result of what was seen as the multiplicity of these influences and their variability according to circumstances. In fact this multiplicity and variability prevented the generalizations about them from assuming the form of quantitative relations of known general properties like those, studied in the core, which the assumption of competitive uniform rates of wages, profits or rents made it possible to establish between these rates and between them and the relative prices of commodities. This heterogeneity between the relationships examined in the 'core' and those considered outside it was in fact such that, in order to be sufficiently general, a simultaneous quantitative treatment of the two would have had to refer to mathematical functions of largely indefinite properties. As a result any simultaneous quantitative

treatment would have been of little or no content. It would have added little to the analysis conducted outside the core, while obscuring those properties which the well-defined general quantitative relations of the core made it possible to establish (an important example of this method is the treatment of the reciprocal dependence between outputs and prices which will be seen in para.10 below).

To avoid misunderstandings, it should be noted that the distinction between the part of the theory to be found in that core and the part outside it, has to do with a difference only in the *nature* of the relationships studied. It has therefore little to do with the comparative interest or importance which one wished to attach to those two kinds of relationships, as should be evident from the fact that questions as central as distribution, aggregate demand, accumulation or technical change fell largely outside the core. It is however true that the relationships studied in the core had been found to provide the necessary basis for dealing with just those questions. An interesting instance of this is Ricardo's need to deal with relative prices in the course of the preparation of that second edition of his *Essay on Profits*, which became the *Principles of Political Economy* (cf. Sraffa, 1951, pp. xxxii–xxxiii).

5. *A comparison with later theory.* This structure of classical analysis and in particular its distinction in separate logical stages contrasts sharply with what we find in modern theory. Distribution is there seen to result from the interaction between 'demand and supply functions' for the services of the factors of production, based on their reciprocal substitution, and this imposes on the theory an entirely different analytic structure.

That substitutability between factors is in fact supposed to result from two kinds of choice: that of the entrepreneurs and that of the consumers. Taking the latter first let us assume, for simplicity, an economy with two consumer goods, 'corn' and 'cloth', each producible by a single method, and such that cloth requires more 'capital' per worker than corn, and for both goods 'capital' consists exclusively of corn. Any fall in the rate of interest would lower the price of cloth relative to corn and the analysis of consumer preferences would lead us to conclude that a higher proportion of the available labour would generally have to be employed in producing cloth – with a consequent increase in the quantity of corn-capital demanded in the economy as a whole.

This effect is of course enhanced when we introduce the other kind of choice mentioned above and therefore the switch in both industries to methods which require more corn-capital per worker and which have become cheaper with the fall of the interest rate. (The 'demand functions' for factors we are here referring to are those implicit in a *general* equilibrium system: for a definition see Garegnani, 1970, p. 423.)

Three consequences follow from this demand-and-supply explanation of distribution. The first is that two of the former independent variables of the classical core, the real wages and the social product, can no longer be determined separately from each other, but have to be determined *simultaneously*. This is evident from the fact that because of both the technical and the consumer substitutability mentioned above, at each point of the demand function for labour there will correspond a different level of the product per head in each industry and a different commodity composition of the social product: size and composition of the social product will therefore only be determinable simultaneously with the wage.

The second consequence is that those two independent variables of the classical authors have to be now determined *simultaneously* with the former *dependent* variables of the

classical 'core'. In fact the real wages, and the social product, can no longer be determined before, and independently of, the other rates of remuneration and of relative prices. Each distributive variable is determined by a strictly analogous demand and supply mechanism. Each point on the demand function of labour implies a price for the service of any of the other factors, just as it implies a level of their employment equal to the supply forthcoming at those prices. Thus the equilibrium in the market for labour (more generally in the market for any of the factors) also defines the equilibrium in the markets of all the other factors. The classical authors' *asymmetry* between the determination of wages and that of the other shares in the product – which showed in the asymmetric treatment of the wage as an independent variable and of the other distributive variables as a dependent residual – gives way to a *symmetric* determination of all distributive variables.

As the real wage cannot any longer be treated as an independent variable when determining the shares other than wages, two new sets of data have to make their appearance to determine it. These are the two necessary elements of the marginalist demand-and-supply mechanism: the tastes of the consumers and the endowment of factors. Thus, in these theories, distribution, outputs and the relative values of commodities are all determined simultaneously, taking as data the tastes of consumers, the endowments of factors of production and the technical conditions of production. The determination of *these* three sets of data is then seen as falling largely outside the domain of economics (the main exception being the size of the capital stock, dependent on savings). This in turn entails a third more general difference from classical theory, in addition to simultaneous determination of the wage and social product and the symmetry in the theory of distribution. In marginal theory the determination of relative prices and of the distributive variables other than wages – which we may describe as 'the theory of value' – becomes almost co-extensive with economics itself, instead of constituting the limited 'core' of economic analysis that it was in the classical economists.

6. *Short versus long 'chains of deduction': social and historical factors in economic theory.* We may note how this more limited scope which the theory of value has in the classical theories gives them the greater flexibility which seems required by a discipline like economics. (An example of the greater flexibility may be provided by the analysis of possible deficiencies of aggregate demand. Because of its separation from the analysis of outputs, the classical analysis of distribution is open, 'in the sense that it neither provides premises capable of justifying the tendency of investment to adjust to saving, nor is it dependent on the existence of any such tendency', contrary to what is true for modern theory (Garegnani, 1978–9, II, p. 340).)

The above limitation of the theory of value in the classical authors appears to have been the result of an instinctive methodological adaptation to the requirements of economics, where, because of the impossibility of experiment and of the complexity and variability of the material, 'the function of analysis and deduction ... is not to forge a few long chains of reasoning, but to forge rightly many short chains'; the limited scope of the theory of value and the analysis by separate stages, are a way of keeping the 'chains of reasoning' short as Marshall realised to be necessary (Marshall, 1949, App. C, 3, p. 638. The success of Marshall's attempt to preserve short chains of reasoning within a marginalist context by means of his method of 'partial analysis' is open to doubt to the extent in which we have to resort to the long chain of reasoning of the general equilibrium system in order to ascertain the

legitimacy of that method, and the degree of approximation of the results obtained in each particular case).

In fact the flexibility resulting from the classical reasoning 'by stages' and the recognition it implies of the multiplicity and variability of the relations examined outside the 'core', appear to be a more or less conscious recognition of the role which broader social, institutional and political factors, in a word historical factors, play in economic phenomena, particularly in the spheres of distribution, accumulation and technical change. The absence of this recognition from later economic theory has often been lamented.

7. *Production versus exchange?* We may also comment at this point on the frequent characterization of classical theories as concentrated on reproducible commodities and hence 'production', as opposed to the concentration on commodities of the 'scarcity type', and hence 'exchange', which would be the hallmark of marginal theories. According to this characterization the two kinds of theory would deal with two distinct series of problems, with an opposite practical relevance in relation to time, the classical theory becoming relevant for the long run, just when marginal theory becomes irrelevant (cf. e.g. Pasinetti 1965, pp. 573–4; cf. also Hicks, 1976, p. 216).

Whereas this distinction may help to describe some differences between the two approaches, it does not seem to go to the roots of such differences, which lie rather in the way in which *both* 'production' and 'exchange' are treated in each approach. Thus, with respect to exchange, the classical determination of the real wage on the basis of the kind of forces discussed above, leads to the determination of profits as a surplus, and hence to the view of relative prices as no more than a way of distributing that surplus between sectors and firms. This implies that the problems of exchange themselves cannot be viewed as problems of 'scarcity' – whether in the short or in the long run. Equally, the determination of distribution by the substitutability between factors of production and their relative scarcity, implies that the problems of production themselves have to be viewed as problems of 'scarcity' in the long run no less than in the short run, and it is only to the extent in which production is so viewed that exchange itself can emerge as a problem of scarcity (on this question, cf. also Roncaglia, 1978, pp. 125–6).

SECTION III. DEMAND CONDITIONS AND RELATIVE PRICES IN THE CLASSICAL THEORIES.

8. *Relative prices independent of consumer preferences.* What we have seen in Section I prepares the ground for understanding the feature of the surplus theories which is perhaps most striking for people used to modern theory: namely, the fact that (as implied in par. 4 above, and as we shall see in more detail in Part II of this essay) relative prices are determined without any appeal to consumer preferences (for a typical reaction to this feature, see Harrod 1961; see also Sraffa's reply, 1961).

The essential terms of this question are simple. As had to be rediscovered in comparatively recent years under the form of a 'non-substitution theorem' (cf. e.g. Samuelson, 1961; cf. also par. 15 and 17 below), the system of relative prices is determined independently of demand conditions and consumers' preferences, once the real wage – or the rate of profit (interest) – is given, and constant returns to scale to labour and means of production are assumed together with single product industries, (two assumptions that we shall retain for the moment). We saw how the classical economists could take the real wage as given when approaching the determination of relative prices. The two things together mean:

(a) that demand conditions and consumer preferences are

irrelevant for the determination of relative prices in the classical theories where the wages are in fact given in approaching that determination;

(b) that their irrelevance is due to the different theory of distribution allowing that treatment of wages.

Indeed let us look at the modern demand and supply functions for an individual product, which may have fostered the impression that the influence of consumer preferences on the prices of products has to do with the marginalist analysis of the market of the product and not with the general marginal theory of distribution. The non-horizontality of the supply curve necessary for that influence – in particular, under constant returns to scale, its upward slope – is simply an expression of the rise in the relative price of the services which are required in a higher proportion in the production of that commodity (cf. Garegnani, 1983, p. 310). Thus the relevance of consumer preferences for the price of an individual product is but an expression of the dependence of distribution upon the output of the commodity in question.

The ‘non-substitution theorem’ is of course generally known. What has engendered misunderstandings has been a failure to appreciate that what in modern theory is a purely hypothetical proposition, constitutes on the contrary an essential aspect of the classical theory of relative prices. The theorem is a purely hypothetical proposition in modern theory because the real wage (interest rate) is *not* known independently of demand conditions and consumer tastes. The relevance of the theorem lies therefore in indicating that demand conditions and consumer preferences can affect prices *only to the extent to which they affect distribution* – which those conditions and preferences do of course affect, because they underlie the demand functions for the factors of production. The position is entirely different in classical theory where the separate determination of distribution allows the wage to be taken as given when determining prices.

As a result of this, the assumption of constant returns to scale will be irrelevant to the question of the determination of prices that we find in the classical surplus theories (and in Sraffa). Constant returns to scale would *not* prevent demand conditions from being relevant, were it not for the underlying theory of distribution, which is different from the modern one. The different classical theory of distribution, on the other hand, makes it possible to determine prices without introducing demand functions and this is so even when returns to scale are variable, as we shall now see.

9. *The theory of the outputs of individual commodities.* Of course, when the hypothesis of constant returns to scale to labour and means of production is abandoned – as it must be in order to deal, for example, with the rent of land – outputs become relevant for determining prices in classical theory. However, the different theory of distribution will be found to entail a determination of outputs which in turn involves their treatment as independent variables in the determination of prices (above, par. 3) – that is, a treatment of them incompatible with the demand functions of modern theory.

The levels of the individual outputs will generally depend, in the first place, on:

(a) the level of aggregate income governing the level of the general purchasing power;

(b) the technical conditions of production (governing, among other things, the outputs of means of production);

(c) the distribution of the social product among the different classes (which will generally use their income in different ways), expressed by the level of the independent distributive variable.

As we saw, in the classical theories the above three sets of circumstances are data when determining the relative prices and the dependent distributive variables. Therefore, insofar as the levels of output depend on these circumstances, they can also be taken as given for the purpose of that determination.

However, and here we get closer to the point in dispute, outputs also depend on individual choices, that is on what modern theory describes as consumer preferences. With respect to this *fourth* determinant it is essential to start by distinguishing between two aspects of ‘consumer preferences’. The first aspect is what we may describe as the *content* of these preferences – the fact, that is, that at given relative prices, say 1:1 an individual may consume 1 of commodity A and 9 of B, and another individual 9 of A and 1 of B. The second aspect is the *formal property* for which, as the relative price of any commodity falls, its quantity consumed will generally increase (we refer to this as a ‘formal property’, because it is supposed to hold irrespective of the *content* of tastes). In the terms of modern theory, we may associate the content of preferences with the ‘position’ of the demand curve, and their formal property with the ‘slope’ of the curve.

It seems evident that what is primarily relevant for determining outputs is the content of consumer tastes. But, this content is just what modern theorists leave to the analysis of psychologists or sociologists, and take as a *datum* when conducting their analysis of demand – which is exclusively concerned with the second aspect above and with the slope of the demand function. It is then difficult to see why the same procedure (to take the ‘content’ of tastes as given) should be objectionable in the classical theories. The paradox is in fact that, unlike their modern counterparts, classical theorists generally considered the analysis of the ‘content’ of preferences to be an important part of economics (as shown for example, by the analysis of the cultural elements affecting workers’ ‘necessaries’).

10. *The dependence of outputs on prices.* However, it could be objected at this point that, though it would be readily agreed that the content of consumers’ preferences can be taken as given when determining prices, the need for a *simultaneous* determination of prices and outputs does arise in classical theory also, because of the *dependence of outputs on prices* – that is, exactly because of the above formal property on which marginalist theorists have concentrated. For example – it could be insisted – if we consider a change in the real wage, how can we determine the new outputs, before, and independently of, the new prices since, plausibly enough, the new outputs will *to some extent* also depend on the new prices? Will it not again be necessary to introduce demand functions expressing this dependence? Will we not arrive then, in the case of variable returns to scale, at a simultaneous determination of prices and quantities in the classical theory of relative prices, just as in modern theory, and this in spite of the two different theories of distribution?

The reply to this objection will here proceed in two steps: we shall first notice how the dependence of outputs on prices can be dealt with by means *other* than demand functions; we shall then indicate why this alternative treatment appears to be the more appropriate one.

The first step centres on an important instance of the classical reasoning by separate logical stages. When relevant, the dependence of outputs on prices can indeed be dealt with in two successive stages:

(i) the effect on prices and on the dependent distributive variable of the change in the independent variable is conducted while assuming that outputs remain constant – or undergo the

specified change when the changing independent variable is some output level (as, e.g., in Ricardo's case of the increased cultivation of 'corn');

(ii) the possible effect (or further effect) on outputs of that change in prices and the dependent distributive variables – together with any *direct* effects on outputs of the changed independent variable (e.g. the change in the output of the means of production which a technical change may have introduced, or rendered obsolete, or the change in the output of wage goods which a change in the real wage will entail) – are then examined in a second stage of reasoning in accordance with the circumstances of the case under consideration. In that same second stage of reasoning, it will be possible to consider any effects which those changes in outputs are likely to have on relative prices and on the dependent distributive variables, when the returns to scale are not assumed constant (together with any further converging secondary changes in outputs and prices).

This two-stage method which can take care of any dependence of prices on normal outputs resulting from variable returns to scale, can also take care, it seems, of the similar dependence which exists in the case of jointly produced commodities, even when constant returns to scale are assumed. The relative scarcity of jointly produced commodities will generally find an objective expression in the co-existence of different processes producing the same commodities (cf. Sraffa, 1960, p. 43n, and Schefold, 1985, pp. 23–6). Therefore a change in the proportions in which the jointly produced commodities are demanded (cf. the concept of 'effectual demand', para. 12 below), resulting either directly from the changes in the independent variables, or from their effects on prices, will generally bring about changes in processes of production in order to adjust to the new proportions, and therefore further changes in prices. Moreover, changes in distribution may render convenient at the existing prices of products some alternative processes of production which will here be associated with different proportions of the jointly produced commodities and, therefore, conceivably, even the appearance or disappearance of scarce commodities. These effects can be taken into account by the above reasoning by stages.

This procedure by stages, which might at first sight appear less satisfactory than the modern *simultaneous* determination of prices and outputs, appears to be the only possible one when we take two further elements into account – and here we come to the second step of the reply to the question raised at the beginning of this section.

Any demand function clearly depends on individual incomes. Now, in marginal theories, the conditions relating to the equilibrium in the market for factors (or other equivalent conditions in the case, e.g., of 'disequilibrium' theories) ensure that, as the demand price varies, the associated constancy or variation in individual incomes can be simultaneously determined together with its influence on the quantity demanded. However, as we abandon marginal theory, we no longer find any such condition relating to factor markets. More generally, it does not seem possible to postulate functional relations of known properties – and, at the same time, of a generality sufficient to render the procedure meaningful – by which to determine the individual incomes and the quantity demanded associated with different prices of the product (cf. the second field of analysis mentioned at para. 4 above). It therefore seems natural to proceed by *separate* logical stages. (To avoid misunderstanding it should be stressed that the above discussion refers to the marginalist *general* relations between the quantity demanded of a commodity and its *price*, and does not relate to the possibility or appropriateness of referring in some cases, to functional

relations chosen in accordance with the case in hand and involving the quantities demanded as variables.)

This first consideration is corroborated when we examine a second element. When the dependence on prices of the normal quantity demanded is likely to be appreciable enough to need consideration, it will often be found that the effect has to be considered as an *irreversible change* in the habits of the consumers (e.g., think of the increase in the demand for cars in the US in the 1920s, as technical developments led to an appreciable fall in their price). Even in marginalist theory any such change could not be treated as a movement along a demand function, but as a change in 'tastes', to be examined, if at all, in a separate stage of analysis, where the data themselves are being discussed.

11. Demand functions and classical theory: some conclusions. If we now try to summarize the main conclusions of our discussion concerning demand functions in classical theory, we find:

(a) That in a classical context the formal properties of consumer tastes lose their importance for the theory of distribution because no attempt is there made to explain distribution by means of the substitutability between 'factors of production'. Consequently they lose their former relevance for the determination of relative prices.

(b) That with the former importance of consumers' tastes, there disappears also the need for a simultaneous determination of outputs and prices: outputs can be studied separately from prices, and can therefore be taken as data when determining the latter.

(c) That, on the other hand, important dependencies of outputs on prices can be taken into account by the two-stage procedure described above.

(d) That, as a result of this and contrary to what is at times held, the assumption of constant returns to scale is not only not essential to the determinations of relative prices in the classical economist (as shown e.g. by Ricardo's treatment of agricultural outputs) but would add little to the significance of their 'natural prices' or 'prices of production'.

12. The classical economists' conception of 'demand and supply'. What we have seen concerning the absence of demand functions in the classical economists should not of course be taken to imply that the 'natural prices' or 'prices of production' to which they referred did not entail an equality between quantity demanded and quantity supplied. The absence of demand functions only implied a treatment of 'demand and supply' which was just as different from that of marginalist authors, as the treatments of distribution and outputs were.

In fact the different determination of distribution and individual outputs allowed the classical economists to envisage demand as a single definite point in the price–quantity diagram, and not as the curve of later theory. This single point was that of 'effectual demand' (Smith, 1776, Bk. I, ch. viii, p. 49), giving the quantity demanded at the 'natural price', or 'price of production'. This conception of demand as a single point, to be compared with the quantity supplied ('actually brought to market': Smith, *ibid.*) in each given situation is what underlies the expression 'proportion' between demand and supply generally used by the classical economists, which shows clearly how demand and supply were not conceived as curves or functions (the term 'proportion' was indeed criticized when the latter conception began to emerge: cf. Bharadwaj, 1978, pp. 256–7). Apart from that single demand point the classical economists needed only the assumption that a

shortage of the quantity supplied, relative to the 'effectual demand', will entail an actual or 'market' price higher than the 'natural' or normal price, and that the opposite will be true when the quantity supplied exceeds the 'effectual demand'. Thus, in the classical economists the interplay of 'demand and supply' only explains the oscillations of *actual* prices and outputs around the *normal* relative prices and the normal outputs, equal to the 'effectual demands', where these normal levels are known independently of any such interplay. As Marx aptly put it 'if supply and demand balance one another, they cease to explain anything' (1894, p. 189).

The case is entirely different in marginal theory, where distribution is functionally connected to the relative demand and supply for products, and accordingly the *normal* price of products cannot be known independently of the interplay of 'demand and supply'. There, the demand cannot conceivably be defined by the single definite point corresponding to a normal price, which is unknown. Accordingly it has to be defined in terms of a function or curve (for the difference between the classical and marginalist treatment of demand and supply, cf. Garegnani, 1983).

[It follows that, contrary to what has sometimes been held, the outputs to which the 'natural' prices, or 'prices of production' of the classical economists, or of Sraffa (1960, cf. e.g. p. 9) refer, are not *actual* outputs at one instant of time, taken as in 'a photograph' (Roncaglia, 1978, p. 21 and *passim*). They are *normal* outputs, no less than those determined by the intersection between the demand and supply functions we find in marginalist theory: only, these normal outputs are determined in the different way we have attempted to describe above. The above view of outputs is sometimes associated with that view according to which the treatment of the real wage (or profit rate, cf. par. 22 below) and of the outputs as independent variables results from the purely analytical interest of examining as 'in a vacuum' the relationships between these variables, the prices, and the residual distributive variables (cf. Roncaglia 1978, p. 21 and *passim*: for a seemingly similar position cf. also Sen, 1978, p. 180). This purely analytical interest would then be compatible with any explanation of those variables. This view likewise seems disputable. In Sraffa that choice of independent variables appears to be the rigorous expression of the procedure we find in the classical economists and, therefore an expression of the kind of explanation those economists gave of such phenomena. Sraffa not only refers to the classical economists for his procedure (1960, pp. v, 9, 93-5), but with respect to the rate of profits he explicitly indicates how his treatment of it as an independent variable expresses the view taken of the forces determining it (1960, p. 33).]

PART II: THE CLASSICAL DETERMINATION OF PROFITS AND PRICES

SECTION IV: THE 'MEASUREMENT' OF VALUE.

13. *Ricardo and the labour theory of value.* In the remainder of this essay we shall be exclusively concerned with problems that arise in the 'core' of the classical theories and, more particularly, with the problems raised by the analysis of the relationship between the real wage, the rate of profits and the system of relative prices.

The conception of social surplus we saw in Section I is the basis from which Ricardo starts his determination of the rate of profits. Since we are concerned with aspects of the classical problem of value which are independent of the rent of land, we may assume that fertile land abounds and rent can be ignored. Thus, on the right hand side of equation (1) we shall find

aggregate profits. Since in Ricardo, as in other classical economists, a yearly production cycle is implicitly assumed, and wages are supposed to be advanced at the beginning of the cycle, wages are a part of capital. Moreover, because of an error (which Marx was later to correct), Ricardo sees the *rate* of profit r as depending exclusively on the division of the product between wages and profits and, therefore, as if the entire social capital consisted of the wages advanced at the beginning of the yearly production cycle (cf. e.g. Ricardo 1951-73, vol. 1, p. 298, also 289-92; and Garegnani, 1984, p. 4). Then we have the equation

$$r = (P - N)/N \quad (2)$$

where for the reasons already seen for equation (1), r should constitute the only unknown.

It is here that a basic problem arises in these theories of distribution. Since the rate of profits r is the ratio between the *value* of the social surplus and the *value* of the necessary consumption, and since these magnitudes in general will be physically heterogeneous, the quantities P and N of equation (2) must be expressed in value terms. But as we have just seen, P and N are taken to be known as *physical aggregates of commodities*; will they remain known magnitudes when they are expressed as *value magnitudes*?

In dealing with the question Ricardo - after his earlier attempt to refer to the agricultural rate of profits, with P and N measurable as quantities of corn (cf. Sraffa 1951, pp. xxxi-xxxii) - has to face the problem of exchange value. His point of departure is Adam Smith's notion of 'natural price': that is, the sum of the wages and profits calculated at their 'natural' or 'average' rates, that must be paid in order to produce the commodity.

In order to overcome the difficulty that arises out of the variability of the value of money, Smith had suggested a 'real' measure of value, consisting of 'the labour which a commodity can command' (e.g., if one kilogram of bread is worth 50 pence, and one hour of labour 500 pence, the 'real' value of the bread will be 0.10 labour hours).

However, when this measurement of the natural prices is adopted in equation (2), we find that the social product, though known in physical terms, is *not* known in value terms. In fact, let us suppose an economy with 3 million workers (assisted, we may assume, by means of production so simple that they can be ignored). By definition the yearly necessary consumption will 'command' 3 million labour years and its value will accordingly be $N = 3m$. The 'natural value' of the social product resulting from those wages plus the profits on them will however be $P = 3.3m$, if $r = 10\%$, but $P = 6.6$ if $r = 120\%$, although the physical social product is exactly the same in the two cases. The attempt to determine the rate of profits by means of equation (2) seems to involve us in circular reasoning; in order to determine r , it is necessary to know P which, however, is only known when r is known.

This variability of P as r varies means in fact that the constraint by which the real wage cannot rise without profits falling (so obvious if we could think of the division of the social product in physical terms) is no longer immediately visible. An 'illusion', as Marx was to put it, is engendered by which prices seem capable of accommodating the increase of wages without any decrease of the rate of profits. Let us indeed suppose that the real wage increases: what will happen to the rate of profits? If the 'real' value of P was 3.3, might it not have remained the same, thus ensuring the constancy of $r = 10\%$, or, possibly, have even increased to 3.6, giving $r = 20\%$? Thus, Smith often lost sight of the constraint binding wages and profits, and envisaged the wage and the profit rate

as determined 'independently and separately' (Marx [1905–10], 1969, p. 217) – the level of the rate of profits being explained in ch. ix of the *Wealth of Nations* (1776, I, p. 78) by the 'competition' of capitalists. (It may incidentally be noted here how the 'adding-up theory or prices' (Sraffa, 1951, p. xxxv), which resulted from this confusion of Smith has been often construed as anticipating the demand-and-supply explanation of value and distribution of the later marginalist theories, in contrast with the explanation of these phenomena which was to be provided by Ricardo: cf. Schumpeter, 1954, p. 189. However, behind Smith's vague references to the rate of profit as determined by the 'competition' of capitalists, there appears to lie only the inconsistency mentioned above. The demand and supply forces of the modern theories, founded on the substitutability between 'factors of production', are in fact as absent in Smith as they are in Ricardo.)

Ricardo's great merit was to see through this circularity, or 'illusion'. This he did by means of a bold hypothesis. Let us suppose that commodities exchange according to the quantity of labour embodied in them: the ratio between the *value* of the surplus product (the physical surplus) and that of the necessary consumption in equation (2) – i.e. *the exchange value of the former, a composite commodity, relative to the latter, a second composite commodity* – will then be equal to the ratio between the respective quantities of embodied labour, like any other exchange value. (Should the necessary consumption advanced at the beginning of the year not be replaced in kind, so that we cannot find a physical surplus product, the rate of profits $r = (P/N) - 1$ would still be determined by an analogous exchange value, that of social product relative to the necessary consumption P/N .) The values of the two aggregates in equation (2) can therefore be 'measured' in terms of embodied labour (cf. Sraffa 1951, p. xxxii). In our example above, if the yearly wage of a worker requires 0.5 labour years to produce, we shall have besides $P = 3m$, $N = 1.5m$ and hence $r = (3 - 1.5) / 1.5 = 100\%$. If however the wage increase to 2/3rds of a labour year, we shall have $N = 2m$ and r will fall to $(3 - 2) / 2 = 50\%$. There is no circularity in equation (2), and no 'illusion' any more than in the given technical conditions, wages might increase without profits decreasing. (The constancy in labour employment at 3m is not essential to the argument; the rate of profits only depends on the ratio P/N .)

14. *The 'prices of production'*. Marx extended this analysis by developing the instrument that had made it possible in Ricardo: the labour theory of value. He distinguishes between a 'constant capital' consisting of means of production, and a 'variable capital' consisting of wages, thus avoiding Ricardo's failure to recognise the proportion between the two kinds of capital as a determinant of the rate of profits. Accordingly, Ricardo's equation (2) can be replaced by

$$r = s / (c + v) \quad (3)$$

where c , the labour necessary to produce the means of production (here assumed to consist of circulating capital only, that is of capital used up entirely during the year) appears alongside the 'variable capital' v (Ricardo's N), and the 'surplus value' s (Ricardo's $P - N$).

What chiefly interests us here, however, is a second advance of Marx with respect to Ricardo: his theory of the 'prices of production'. Commodities do not exchange according to the quantities of labour embodied, but Ricardo's analysis had in fact remained confined to that hypothesis (see, however, Sraffa 1951, pp. xi–xix for Ricardo's attempt to develop an 'average commodity' in terms of which P and N would remain constant

in spite of changes in relative prices). It was left for Marx to develop a more general treatment, which came within a single step of the correct solution to the problem.

The idea which guides Marx is that the cause of the deviation of the exchange ratios of the commodities ('prices of production') from the ratios of the quantities of embodied labour ('values') is the need to *redistribute* the social surplus value s among the several industries with capital of a different 'organic composition' c/v in order to realize the uniform competitive rate of profits. But if a *redistribution* of surplus value among industries is what is involved, it would seem that the resulting *general* rate of profits must necessarily be the ratio of aggregate surplus value to aggregate capital and, accordingly, that it will remain that of equation (3), as if commodities exchanged according to embodied labour (cf. Garegnani, 1984, pp. 306–7). The 'prices of production' of the commodities could then be obtained by applying that rate of profits on the capital employed for their production. In an economy with two commodities only, corn and steel, we would have the two price equations

$$\begin{aligned} p_c &= (1 + r)(c_c + v_c) \\ p_s &= (1 + r)(c_s + v_s) \end{aligned} \quad (4)$$

which should determine p_c and p_s , the level of r being determined by equation (3) (the prices would be determined in terms of the natural product since the sum of prices would be equal to the sum of values).

However, Marx's argument was not correct. This can be seen immediately, if we remember that (see para. 13 above) the rate of profits is a *value in exchange* – that of the 'surplus product' relative to social capital: if commodities in general do not exchange according to embodied labour, there is no reason to expect this to be the case for those two particular (composite) commodities. The rate of profits r will not, therefore, be generally determined by equation (3), nor, consequently, will the prices of production be those of equations (4). Marx's intuitive argument about prices resulting from a redistribution of surplus value in proportion to capital overlooked the fact that the former changes relative to the latter while it is being distributed. (It may, however, be of interest to note that the argument would be true if referred to the *wage goods sector* we shall see below in Section VI.)

Marx had a glimpse of the error, though from a different angle. He noticed that in equations (4) the variable and constant capital should have been expressed in terms of 'prices of production' and not in terms of embodied labour (Marx, 1894, p. 164): evidently competition can only equalize the rate of profits on what capitalists pay for capital goods, that is, on their prices of production. Let us introduce the correction into our simple example and see where it leads. If we suppose the variable capital to consist of corn and the constant capital to consist of steel, and the prices p_c, p_s to refer to the quantities of each commodity embodying one labour year, we shall obtain:

$$\begin{aligned} p_c &= (1 + r)(c_c p_s + v_c p_c) \\ p_s &= (1 + r)(c_s p_s + v_s p_c) \end{aligned} \quad (5)$$

It is sufficient to divide both equations by p_c in order to see that they in fact contain *one* unknown only, the relative price p_s/p_c , and that they contradict one another when a profit rate determined in accordance with equation (3) is introduced into them. To overcome this contradiction the profit rate must be left to be determined by equations (5) themselves. Again, equation (3) turns out to be incorrect.

There is, however, a sense in which Marx's error was productive. He treated as integral parts of a *single* method for

the determination of the rate of profits and the prices what are in fact, when consistently developed, two *alternative and equivalent methods*, each of which is sufficient to determine that rate and hence also relative prices. The first, which we may call the 'price-equations method' is exemplified by equations (5) and determines the rate of profits – or, more generally, the relation between the wage and the profit rate – *simultaneously* with relative prices. However, the basic idea of profits (the non-wage share) as a *surplus product*, which they can be seen to be whenever the economy is in a self-replacing state, inevitably leads one on to look for some simpler method. The second method, which we may here call the 'surplus-equation method', is exemplified by equation (2) or (3), for the case in which commodities exchange according to labour embodied. Essentially, this method depends on the possibility of expressing both the surplus and the capital that appear in the equation in terms which are proportionate to their values, but do not contain the unknown price, so that we have one equation in which the rate of profits is the only unknown. As Part III below indicates, this second method is also available for sufficiently general hypotheses and as we shall see, it exhibits notable advantages of simplicity and transparency with regard to the underlying properties of the system.

15. *The labour theory of value in Ricardo and Marx.* Before proceeding to the solution which can be provided for Ricardo and Marx's problem along the lines of the two methods just mentioned, we may note how what we saw concerning the role of Ricardo's labour theory of value in overcoming the error implicit in Smith's 'adding up' theory of prices, brings us to question a view of that theory which is still widely accepted. The view is that according to which the labour theory of value in Marx – and in Ricardo – was an analytically unnecessary 'detour', undertaken mainly under the influence of ethical or ideological preoccupations (cf. e.g. Myrdal, 1929, p. 63; Samuelson, 1971, p. 69; cf. also Sen, 1978, pp. 177–9, where any 'predictive' meaning is denied to Marx's use of the theory; Morishima, 1973, e.g. pp. 85–6; Meek, 1977, p. 121, etc.). However, if what we contend is correct, it was owing to the labour theory of value that Ricardo and Marx reached the conclusion that the rate of profit (interest) is determined once the real wage is given. Now, a few decades ago this proposition was still new enough to constitute the crux of a 'non-substitution theorem' (Samuelson, 1961; cf. par. 8 above). A theory like the labour theory of value which made it possible to arrive at it nearly 150 years earlier, would seem to have been more a drastic analytical advance than an 'analytical detour'.

This purely analytical role of the labour theory of value is in fact confirmed by a closer consideration of Marx's double distinction between the 'apparent' relations of production of 'bourgeois society' and its inner or 'intrinsic' relations or connections, on the one hand, and between 'vulgar' and 'classical' forms of political economy on the other.

According to Marx, the 'apparent' relations are those which are perceived by the unsystematic observer. We still find them in Adam Smith's 'adding up' theory of prices, when 'instead of resolving exchange-value into wages, profit and rent, Smith constructs the exchange-value of the commodity from the value of wages, profit and rent, which are determined independently and separately' (Marx, 1905–10, II, p. 217). In such an inconsistent representation of the economic system 'the contradictory character of capital is totally concealed and effaced ... no contradiction to labour is evident' (Marx, 1905–10, III, p. 467).

There are, on the other hand, the real relations constituting the 'intrinsic', or 'inner' connections of the bourgeois system. These are the relations which had been progressively brought to light by the systematic 'scientific' analysis, carried out by 'classical' political economy (Marx, 1867, p. 85; 1905–10, vol. II, p. 165), including the naive, still contradictory stage represented by Smith. These relations centre on the constraints (or 'inner' connections) that bind changes in wages to changes in profits and rents (on this double distinction of Marx cf. also Garegnani, 1984, pp. 303–4).

Now, in order to arrive at those true relations it appeared necessary to measure the product – that is, for the reasons we saw above, the *value* of the product – *independently* of its division between the three classes, so that this value could be shown to 'resolve' itself into wages, profits and rent. Hence the role of Ricardo's measurement of values in a labour embodied standard, in terms of which, in Marx's own words, the value of the commodity 'does not depend upon its division into wages, profits and rents' and constitutes instead 'the *limit* ... for the dividends which the labourers, capitalist and landlord will be able to draw from this value in the form of wages, profits and rents' (Marx, 1894, p. 854, and 1905–10, II, p. 219).

If what has been argued above is correct, it will also appear difficult to accept the distinction between a 'labour theory of value' and a 'cost of production theory of value' which would alone be attributable to Ricardo (Stigler, 1958, p. 357), insofar as 'analytical statements' are concerned (ibid. p. 366). Indeed it seems that neither Ricardo nor Marx ever held what is there called a 'pure labour theory of value' and that, in a sense, both authors held a 'cost of production theory of value'. The problems to which the labour theory of value is an answer are neither an approximate estimation of relative prices for their own sake, nor some *a priori* considerations on the nature of society. Rather they lie in how the rate of profit appearing in a 'cost of production theory' can be correctly determined. (If the distinction, also drawn in Stigler, 1958 p. 366, between an 'empirical' labour theory of value based on 'costs of productions' held by Ricardo, and an *a priori* one, held by Marx, thus appears questionable, no less questionable seems the similar view sometimes advanced according to which there would be a 'Ricardo approach' to the problem of value which, contrary to that of Marx, would be founded on the simultaneous determination of both the general rate of profits and the prices of production (cf. Garegnani, 1984, p. 305 n.25.)

SECTION V. THE 'PRICE-EQUATIONS METHOD' OF DETERMINING PROFITS.

16. *The price equations.* The 'price-equations method' arises from the generalization of equations (5). In these equations we assumed that constant capital consists of one commodity only. When that assumption is abandoned, the constant capital of each industry has to be distinguished into as many quantities of embodied labour as there are different means of production. This is required in order to apply the price appropriate to each kind. Of course, to each additional *unknown price* so introduced in the equations, there will correspond an additional *price equation*. Matters are even simpler for the variable capital: the assumption of a uniform real wage ensures that, in all industries, variable capital consists of the same composite 'wage commodity' and that we may apply to it the single price obtainable from the prices of its constituent commodities.

We may now write the price equations obtained by generalizing equations (5) for the case of any number k of commodities a, b, \dots, k .

Let a be produced during the year by L_a labourers assisted by the quantities of constant capitals A_a, B_a, \dots, K_a , (some of which may be zero) consisting respectively of commodities a, b, \dots, k ; so that the quantity of commodity a produced in the year requires a total quantity of labour (direct and indirect) given by $A = L_a + A_a + B_a + \dots + K_a$ of direct and indirect labour; $L_b, A_b, B_b, \dots, K_b, B; \dots; L_k, A_k, B_k, \dots, K_k, K_k$, being the analogous quantities in the production of commodities b, \dots, k ; w being the quantity of labour necessary to produce the given real wage; $\lambda_a, \lambda_b, \dots, \lambda_g$ (such that $\lambda_a + \lambda_b + \dots + \lambda_g = 1$) being the quantities of labour embodied in the wage goods (g in number) constituting a unit of the 'wage commodity' λ , which is chosen as the numéraire.

We shall then have:

$$[(A_a p_a + B_a p_b + \dots + K_a p_k) + L_a w](1 + v) = A p_a$$

$$[(A_b p_a + B_b p_b + \dots + K_b p_k) + L_b w](1 + v) = B p_b$$

...

$$[(A_k p_a + B_k p_b + \dots + K_k p_k) + L_k w](1 + v) = K p_k$$

$$\lambda_a p_a + \lambda_b p_b + \dots + \lambda_g p_g = 1. \quad (6)$$

Equations (6) are $(k + 1)$ in number and contain the same number of unknowns: the rate of profit r and the k prices of production p_a, p_b, \dots, p_k . (For the existence and properties of the solution cf. Garegnani, 1973, pp. 332-40; cf. also par. 22 below.)

It can now easily be seen that the need to distinguish the constant capital of an industry, say a , into the quantities A_a, B_a, \dots, K_a makes it no longer essential to measure them in terms of labour embodied. The prices of production p_a, p_b, \dots, p_k may be applied directly to the physical inputs of a, b, \dots, k . The same applies to the variable capital $(L_a w), (L_b w), \dots$, consisting of the composite 'wage commodity' (which being our numéraire, has a unit price of production). These physical quantities are generally preferable, because they depend only on the method of production of the commodity concerned, and not, in addition, on the methods of the commodity's direct and indirect means of production, as is the case for the corresponding quantities of labour embodied. Equation (6) can therefore also be read with the quantities w, A_a, \dots, B_a , etc., taken as physical quantities. Henceforth, we shall adopt this alternative reading of equations (6).

17. *The price equations from Marx to Sraffa.* Equations (6) are in fact those we find in Sraffa's *Production of Commodities by Means of Commodities* (cf. e.g. 1960, p. 6, where the equations only differ from the above because the wages are included, commodity by commodity, among the means of production). Indeed Sraffa's own symbols were chosen for equations (6), so as to bring out how his equations are the same as Marx's equations (3) and (4), once the latter are modified by applying the price of production to variable and constant capital. The fact that such a modification had been suggested by Marx himself does not however prevent this procedure from changing his equation (3) and (4) beyond *easy recognition*. The essential point, however, is that equations (6) provide a general solution to precisely the same problem which Ricardo and Marx had faced by means of the labour theory of value. The characteristic premises of the surplus approach, for which the real wage and the social product are given when determining the rate of profit and relative prices have remained unaffected. Therefore, the notion of profits as a residual and the view of

the forces determining distribution associated with it have remained equally unaffected (cf. below on the meaning, in this respect, of ch. I of Sraffa, 1960).

However, equations (6) are less transparent about the forces governing the rate of profits than were Ricardo's equations (2) and Marx's (3). The basic asymmetry between a wage independently determined and profits resulting as a residual is obscured. In equations (6), to envisage profits as a difference between the value of the product and that of the wages and means of production seemingly makes less sense than the reverse idea of the price of the product, an unknown of the equations, resulting from adding profits to the wages and to the value of the means of production. These 'appearances' are the very ones which, as we saw (par. 13), had misled Smith and the 'vulgar' political economists into thinking that profits and wages could be determined independently of one another – the same appearances that were overcome by Ricardo and Marx's measurement of value in terms of embodied labour. They have their source in the difficulty of grasping the interdependence of prices and can today be dispelled by the consideration of the *system* of price equations as distinct from the indeterminate individual price equation. (It was long after the times of Smith and Ricardo, or even of Marx, that it became possible for economists to think of the *system* of price equations and for the latter to reveal their implications for the constraint linking the real wage and the rate of profit.) Thus equations (6) reveal that once the real wage is given, the rate of profits is determined and that the two cannot change independently of one another.

But a reasoning that relies on theorems which abstract from the content of the problems analysed, cannot fully overcome the difficulty of grasping the effects of the interdependence of $(k + 1)$ unknowns, and cannot therefore have the transparency of surplus equations like (3). Thus, e.g., the nature of profits as a residual had to be clarified by Sraffa in the first chapter of (1960) by showing how prices just sufficient to repay the wages and to replace the means of production, which are possible when no surplus product exists, become *contradictory* when that surplus is present: a point that would have been evident in equations (2) or (3), or the corresponding more general equations (8) or (10) below. A further, and perhaps more striking example of this lack of transparency is the sense of novelty which greeted the 'non-substitution theorem' already mentioned above (para. 8 and 15), the proposition, that is, that, in an economy like that of equations (6), the real wage is given irrespective of consumer's demand, when the rate of profits (rate of interest) is given – a proposition obvious from equations (2), (3), (8) or (10).

The transparency of surplus equations like (2) or (3) was ultimately due to what we referred to above as the 'surplus equations method' (para. 14). The surplus equation provides a 'picture': that of a *known* product to be divided between wages and profits; with the rate of profits originating from the distribution of the surplus of this product over wages, in proportion to the amount of capital. This 'picture' allowed a concrete mental representation of a highly abstract analysis: so that the dependence of the rate of profit on real wages could be *seen* 'at a glance', and the properties of the economic system associated with this basic relationship were under a correspondingly better grasp. Of course social product, necessary consumption and social capital are, in themselves, highly abstract notions. The mind can, however, fit them into a 'picture' and proceed to operate with them (as the mind of a child can with an abacus), as if they were concrete objects connected by the simple relations of the part and the whole.

The importance of this 'picture' should of course not be

confused with that of a mere didactic device, which could always be obtained by means of simplifying assumptions. This importance has to do with the command it allows the mind to obtain over purely abstract relations. It has therefore, ultimately to do with the possibility of advancing our knowledge and of achieving new results (cf. Garegnani, 1984, p. 312, n.38).

Naturally, reality need not be simple, and need not allow for a 'surplus equation', like (2) or (3), beyond the hypotheses necessary to validate the exchange of commodities according to the quantity of labour required for their production. In the next section we shall however indicate how, under our present assumptions regarding the wage rate, a determination of the rate of profits along the lines of the 'surplus equation method' becomes possible, provided we focus our attention on the 'integrated wage goods sector' of the economy, where the general rate of profit is in fact determined. We shall then see how an even simpler 'picture' becomes possible – in the shape of Sraffa's standard system – when, with him, we come to envisage the possibility that the rate of profits should become the independent variable of the system, to the extent to which, as we shall see in para. 23 below, wages are allowed to share in the surplus.

SECTION VI. THE SURPLUS-EQUATION METHOD: 'INTEGRATED WAGE-GOODS SECTOR' AND 'STANDARD SYSTEM'.

18. The determining role of the commodities entering the wage.

Let us single out in system (6) the price equations of commodities a, b, \dots, h , consisting of the wage goods a, b, \dots, g , and of their direct and indirect means of production $(g+1), \dots, h$. The definition of these commodities, h in number (where $h \leq k$), implies that, in the corresponding h price-equations, we shall find as unknowns only their h prices, plus the rate of profits r . It follows that these h equations, together with the last equation in system (6), defining the 'wage commodity' as the numéraire, will be sufficient to determine the rate of profits and the h prices independently of the remaining $k-h$ price equations. It results therefore that once the level of the real wage is given, the general rate of profit will depend exclusively upon the technical conditions of production of the wage goods and of their direct and indirect means of production (on the origin of this result, cf. Garegnani, 1984, p. 313, n. 39).

19. *The integrated wage-goods sector.* Let us now look more closely at the particular part of the productive system which consists of those h industries taken in the particular proportions required in order directly and indirectly to reproduce the aggregate wages advanced to the workers for the year together with the means of production directly or indirectly required for that purpose. This part of the economy constitutes what may be called the 'vertically integrated sector of the wage-goods' or *integrated wage-goods sector* for short.

Let us express both the net yearly product of this sector and the wages paid in it in terms of Smith's 'labour commanded' standard, that is in terms of the quantity of labour which those aggregates of commodities can buy. In terms of this measure both product and wages will be known *before* the rate of profits and the individual relative prices are known. In fact the net product, being the yearly wages of the known number L of labourers employed in the economy will evidently 'command' L labour years. The wages paid in the sector, on the other hand, will command L_c labour years, L_c being the number of labourers required for the direct and indirect production of the 'necessary consumption' – also a known quantity since the real wage and the technical conditions of the direct and indirect

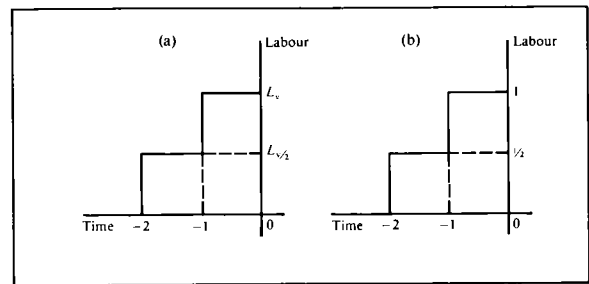


Figure 2 The quantities of 'dated labour' required for the production of the yearly aggregate of wage goods (section a) and the proportional distribution of labour overtime in the production of the wage commodity (section b).

production of its constituents are known (cf. the assumption of a single method of production discussed above, par. 3).

It follows that in the integrated wage-goods sector, the amount of profits in terms of 'commanded labour' constitutes what may be called a *surplus value* ($L - L_c$) which is also known before the rate of profits and the relative prices are determined. Interestingly enough, this surplus value coincides numerically with Marx's own social surplus value s (since $L = v + s$ and $L_c = v$), though it differs from the latter because: (i) it is the surplus value of the wage-goods sector, and not that of the entire economy; (ii) it is expressed in terms of labour commanded, and not of labour embodied.

20. *The rate of profits.* When we proceed, as we must, from the *amount* of profits to the *rate* of profits, the obstacle we meet is that unlike the value of the product and the wages, the value of the means of production in the wage-goods sector, expressed in commanded labour, is not known independently of the rate of profits and of the individual relative prices. We might therefore seem unable to obtain a 'surplus equation' where the rate of profits is the only unknown (para. 17 above). The obstacle can however be overcome by the device of reducing the means of production to 'dated labour'.

A simple example will show how this view of capital can be applied to the means of production of the integrated wage-goods sector in order to obtain a 'surplus equation' determining the rate of profits. Consider an economy where wages consist exclusively of 'corn'. Corn is produced with one 'plough' per worker. The 'plough', which is entirely consumed during the year, is in turn produced by one unassisted worker. The L workers employed in the integrated wage-goods sector will accordingly have to be distributed half in (directly) producing the 'corn', and half in reproducing the 'plough'. The capital advanced for the direct production of corn during the year will consist of the wages of the agricultural workers *and* of the ploughs.

If we now consider that ploughs must have been produced during the year before the one in which corn is being produced, the capital used in the production of corn emerges as the wages of the two quantities of 'dated labour' shown in Figure 2a: $L_c/2$ labour years applied at moment (-2) for producing the 'ploughs', which are then used in the successive 'stage' of corn production, together with a further $L_c/2$ labour years applied at moment (-1) (we are assuming labour to be applied in the moment in which the wages for it are paid). Expressed in 'commanded labour' the wages, to which the entire capital of the integrated wage-goods sector has thus been reduced, will equal the corresponding quantities of dated labour, that is $L_c/2$ advanced at moment (-2) and $L_c/2$ advanced at moment (-1) .

The rate of profits can then be seen to emerge from the distribution of the surplus value $L - L_v$, in proportion *both* to the wages advanced, and to the time for which they have been so advanced, account being taken of compound profits, that is

$$L - L_v = r \frac{L_v}{2} + 2r \frac{L_v}{2} + r^2 \frac{L_v}{2} \quad (7)$$

where the term $rL_v/2$ indicates the share of surplus value allotted to the capitalists advancing the wages paid at time (-1) ; and the term $2rL_v/2$, together with the compound profit term $r^2L_v/2$, indicates the share allotted to those paying the wages at time (-2) . The rate of profits is the only unknown in (7). (For a general discussion of this representation of capital, cf. Garegnani, 1960, pp. 25–30.)

It is convenient at this point to divide both sides of equation (7) by L_v obtaining

$$\frac{L - L_v}{L_v} = r \frac{1}{2} + 2r \frac{1}{2} + r^2 \frac{1}{2} \quad (8)$$

On the left of the equality sign we find, expressed in commanded labour, the amount of surplus value per worker in the integrated wage-goods sector. This amount is identical to Marx's rate of surplus value s/v . On the right of the equality sign we find instead a function expressing the amount of profits per worker, also expressed in commanded labour, which would be necessary in the sector in order to pay a rate of profits r . This function, which we may call the 'profits function' for short, depends purely on the *proportional* time distribution of the labour necessary to produce the wage commodity (see Figure 2b). It does not therefore depend on the *level* of the real wage: it depends only on the physical *composition* of the real wage and on the methods for the direct and indirect production of the wage-goods.

The 'profits function' has an important property which can be shown to hold with any kind of circulating capital, and also with fixed capital of constant efficiency (cf. Garegnani, 1984, p. 317, n. 45). It is zero when $r=0$ and it rises monotonically with r .

The solution of the 'surplus equation' can now be represented in the diagram of Figure 3a, where r is measured horizontally and the rate of surplus value is measured vertically. There we have the curve $0s$ representing the 'profits function', which rises monotonically from the origin. Furthermore, in the case of our example, where the reduction to labour can be completed in a finite number of steps, the 'profits curve' rises indefinitely as r rises *indefinitely*, as represented in Figure 3a. It will however more generally be the case that either a wage good or one of its direct and indirect means of production requires directly or indirectly itself in order to be produced and, accordingly, the reduction to labour cannot be completed in any finite number of steps. In this case, which may be called of 'circular production', the 'profits curve' rises indefinitely as the rate of profits approaches a 'maximum rate of profit' R , as in Figure 3c (cf. Garegnani 1973, p. 335–6). The rate of surplus value $(L - L_v)/L_v$ can on the other hand always be represented by a horizontal line. The level of the rate of profits which solves the equation will be that for which the 'profits curve' $0s$ cuts the surplus value line.

The fact that the 'profits curve' is rising monotonically ensures that the solution will be unique and positive for any positive rate of surplus value—that is, for any level of the real wage less than the product per head in the integrated wage-goods sector. Figure 3a makes it clear that this single positive rate of profit depends exclusively on two circumstances: (i) the rate of surplus value, and (ii) the proportional time-distribution of the labour necessary to produce the wage commodity, which determines the shape of the 'profits function' (taking the place of Marx's 'organic composition of capital', cf. para. 22 below).

The fact that the 'profits function' is an increasing function also clarifies a second set of properties of the system, pertaining to the relation between the wage and the rate of profits. A rise in the wage that leaves its commodity composition unchanged will decrease the rate of profits. This will be so because L_v will rise in the same proportion as the real wage rises and the rate of surplus value $(L/L_v) - 1$ will accordingly have to decrease. Its line will then intersect the unchanged 'profits function' for a lower rate of profits (cf. the shift from A to A' and from r to r' in Figure 3a).

The same conclusion can be seen to apply if the real wage changes in composition, but in such a way that it increases in one or more of its components with no decrease in any of the others. However, in order to see why the conclusion applies, it is convenient to shift our attention from Figure 3a, which relates to *rates* of surplus value $(L - L_v)/L_v$, to Figure 3b, which refers instead to *total* surplus values $(L - L_v)$ in the integrated wage-goods sector as a whole. No point of the 'total profits curve' of Figure 3b will be shifted downwards, indeed all its points (except that for $r = 0$) will generally be shifted upwards because of the amount of profits to be paid on the wages for the labour required to produce the additional items of the aggregate real wages (the new 'total profits curve' $0s$ could only remain unaffected in the unlikely case that the labour required for the production of such wage goods is completed). On the other hand, the aggregate surplus value $(L - L_v)$ will fall, because of the increase in L_v : the rate of profits will therefore fall, as shown by the shift from B to B' and from r to r' in Figure 3b.

However, when the composition of the real wage changes in

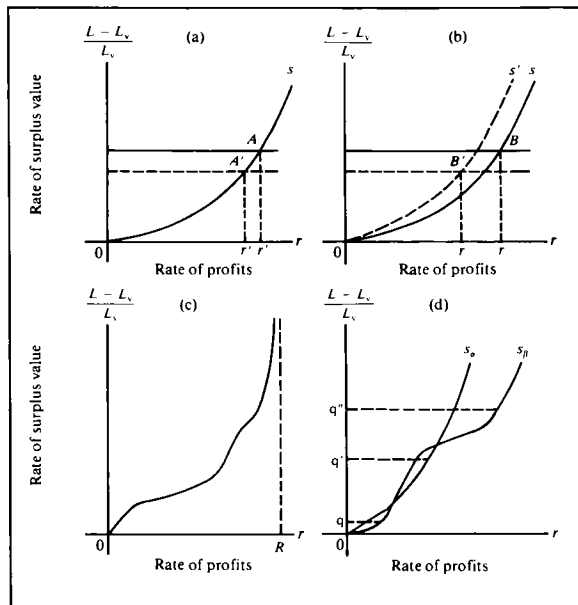


Figure 3 Determination of the rate of profits by means of the amount or rate of 'surplus value' and of the 'profits function' in the integrated wage goods sector. Section (a) considers the rise of a real wage of unchanged physical composition; section (b) the rise of a real wage of changed composition. Section (c) considers the shape of the 'profits function' when production is 'circular'; section (d) shows the possible shape of the 'profits function' corresponding to two different wage commodities α and β .

such a way that the quantity of some components rises while that of others falls, then the profits curve can change in any way whatever. In that case the rate of profits may also change in a direction opposite to that in which the rate of surplus value has changed, in line with what Marx saw as possible when the organic composition of social capital changes together with the real wage (cf. e.g. Marx, 1974b, p. 869). However, contrary to what Marx thought, it will not be possible independently of the rate of profits to order the different physical compositions of the social product, or of the wage commodity, according to the organic composition of the capital required and, therefore, according to their effect on the rate of profits, whatever the rate of surplus value. As Figure 3d shows, a composite wage commodity α , giving the profits curve $0s_\alpha$, would yield a higher rate of profits than the wage commodity β giving the profits curve $0s_\beta$ at the low rate of surplus value q , but a lower rate at the higher rate of surplus value q' and a higher one at the still higher rate of surplus value q'' (cf. para. 22 below).

21. *Physical measurements also possible in the wage-goods sector.* It may be noted at this stage that a measurement independent of the rate of profits alternative to labour commanded is also available for the magnitudes of the integrated wage-goods sector. The net output of the integrated wage-goods sector is physically homogeneous with the wages paid there, since both consist of the same composite wage-commodity. The amount of profits in the sector could therefore be obtained as the difference between two physical quantities of the wage commodity, and the rate of profit could be seen to arise from the distribution of this *surplus product* over the capital of the wage-goods sector, reduced to wages in the manner we have considered above and consisting of the same wage commodity.

The 'commanded labour' standard has however the advantage that in terms of it the product of the integrated wage-goods sector can continue to be expressed in the same units, and remains constant, when the real wage changes either in level or composition, in the way we saw above.

22. *The determinants of the rate of profits.* These properties of the wage-profits relation, made easily visible by surplus equations (7) and (8), are thus closer than we might perhaps have expected to Marx's conclusions on the matter. In particular, it is confirmed that the rate of profits depends on two circumstances, and two alone; the rate of surplus value s/v , and the proportion between means of production and labour. However, the correction of the error implicit in equation (3), modifies Marx's own specification of the second circumstance as the 'organic composition' of social capital, in two important respects.

In the first place the proportion of labour to means of production on which the rate of profits depends, is that of the integrated wage-goods sector, and not that of the whole economy, as Marx thought. This in turn implies that he was mistaken in believing that changes in the relative outputs of commodities could affect the rate of profits through variations in the proportion of labour to means of production in the economy as a whole, independently of any change in the real wage (cf. e.g. Marx 1894 p. 162: it may be noted here, how this flaw in Marx's analysis is repeated in recent works: cf. e.g. Mandel, 1975, p. v; Rowthorn, 1976, pp. 62-3). The same general deficiency implies that Marx was incorrect when he implied that changes in the technical conditions of production of 'luxuries', or of their specific means of production, could affect the rate of profits because of the connected variations in the organic composition of social capital.

In the second place, the proportion of labour to means of production (whether in an individual sector or in the economy as a whole) cannot be expressed by the ratio c/v and must instead be expressed by the proportionate distribution over time of the labour necessary to produce the wage commodity or, of course, by the physical quantities of the several constituents of capital. We have seen above (para. 20) one consequence of this in the different sign which the effect on r of a given change in the physical composition of the wage commodity will have at different levels of the rate of surplus value. This is of course a consequence of the fact that it is impossible to measure capital by a single magnitude independent of distribution, a fact which, as is well known, deeply affects the validity of the dominant theories.

23. *Sraffa's standard system.* Sraffa's 'standard system' provides a similar 'surplus equation method' for analysing the relations between wages and the rate of profits, under hypotheses regarding the determination of distribution which are partly different from those we have considered here.

The classical authors (in particular, Smith and Marx) had admitted or implied that normal wages could include an element of surplus, when the surplus is conceived as the entire excess of the product over the *subsistence* of workers. However, it was also implied that the circumstances determining the *division of the surplus* between wages and profits would act, so to speak, from the side of wages (as e.g. in the case of trade unions managing to bargain for a real wage above subsistence), and would therefore require no modification in the treatment of real wage (including its surplus element) as a datum or independent variable in the 'core' of the theory. Instead, Sraffa suggests that the division of the surplus might be influenced by circumstances acting from the side of the rate of profits: he suggests that the rate of profits is susceptible of being determined by the money rate of interest (Sraffa, 1960, p. 33). The rate of profits can then appear as an independent variable, up to the maximum limit set by the subsistence wage. In that case the wage, the dependent variable, may be envisaged as an abstract value quantity, measurable in terms of any commodity and not only in terms of the commodities on which wages are actually spent (ibid.).

As a result of this, a very simple surplus equation becomes possible for the study of the relation between the wage rate and the rate of profits. As Sraffa shows, under our present hypothesis of single-product industries, a unique set of positive proportions of industries in the economy will exist such that the resulting composite product consists of the same commodities, taken in the same proportions, that are to be found among the means of production of this composite product itself (Sraffa, 1960, chs IV and V). These proportions define the composite commodity Sraffa calls the 'standard commodity'. When the corresponding multipliers are applied to the industries in the economy under consideration – assuming the absolute size of the latter as represented by the labour employed to remain constant – we have the 'standard system'. If we then use the above freedom acquired with respect to wages, by measuring them in terms of the standard commodity, we shall have a physical homogeneity between *all three* the magnitudes on which the relation between the wage and the rate of profits depends, namely the net product, the wages and the means of production.

Let us now choose as the unit for expressing the physical quantities of the standard commodity, the *net product* of the standard system. Let us also choose the labour employed in the economy, and therefore in the standard system, as our unit of labour, so that the wage rate w , assumed to be paid

post-factum, coincides with total wages. We may then write

$$w = 1 - rM \quad (9)$$

where M is the amount of standard commodity used as means of production in the standard system. The quantity of M is however the reciprocal of R , Sraffa's standard ratio: the ratio, that is, between the net product (our physical unit for the standard commodity) and the means of production of the standard system. As a result, equation (9) can be written as

$$w = 1 - r/R. \quad (10)$$

This linear relation between r and w will apply to the real economy with its actual outputs as soon as wages are measured in terms of the standard commodity. (Indeed the price equations of the real system will then differ from those of the standard system only because of the different proportions in which the equations are taken. What the Standard system thus does, is to provide a 'surplus equation method' of arriving at that relation, with a corresponding 'picture' of the relations of distribution (para. 15 above). In Sraffa's own words, the purpose of the standard system is 'to give transparency to the system and render visible what was hidden' (1960, p. 23).

24. CONCLUSIONS. In this essay we have been concerned with introducing the basic elements of the approach to distribution and relative prices which had been developing for about two centuries from William Petty to Adam Smith, Ricardo and Marx. A characteristic phenomenon which has not perhaps yet been studied sufficiently is indeed the way in which this approach has been 'submerged and forgotten' (Sraffa, 1960, p. v), rather than criticized and shown to be deficient. Its abandonment came as a slow process which occupied the half century following the death of Ricardo and was largely one of progressive obfuscation. Later, this process was clinched, so to speak, by interpretations of the work of the classical economists as a primitive, incomplete version of the later marginalist theories. The failure to draw the distinction we saw in section III above, between the classical conception of a 'proportion' between supply and demand, and the later conception of demand-and-supply functions helped in this direction (cf. e.g. Bharadwaj, 1978, pp. 264-5 and Garegnani, 1983, pp. 312-13; also cf. the 'canonical classical model mentioned in par. 3 above).

Our purpose, which was confined to providing an introduction to this approach, has led us to focus on three main issues. The first concerned the analytic structure of the theory and the 'short chains of deductive reasoning' which deeply differentiate it from later theory. The second concerned the problem of the 'measurement' of aggregates of commodities, which is peculiar to this approach and explains the role which Ricardo and Marx's labour theory of value has played in it. (This point acquires some additional interest when we remember that the marginalist criticism of the classical approach, in so far as it occurred at all, was focused on that value theory, and on the fact that commodities do not exchange according to the quantity of labour embodied as if Ricardo or Marx had ignored it: a leader of this kind of criticism was Böhm-Bawerk, 1889, pp. 353-62; 367-8.) The third and final issue concerned the continuity between the work of the classical economists and the contemporary work of Sraffa and other authors working along the same lines.

Thus, the introductory purpose of this essay explains why it concentrates on the analytic structure of the theory and on the problem of relative prices to the exclusion of the problems of distribution proper (except for what we saw in Part I), accumulation and aggregate demand together with

their links with monetary theory. The same purpose explains the simplifications which we have used for our discussion, such as the hypothesis that only one method exists for the production of each commodity (cf. however para. 2 above) and, for most of the essay, the assumptions of circulating capital, no joint production and free natural resources. For these questions the reader may turn to the classical authors themselves and to the already extensive recent literature associated with the resumption of the classical approach.

PIERANGELO GAREGNANI

See also QUANTITY OF CAPITAL.

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surplus value. Profitability regulates the health of capitalist society. In this regard, Marx identifies *two* distinct sources of profit: profit on transfer (or even forcible appropriation) of wealth, which dominates the Mercantilist period; and profit on production of surplus value, which comes into prominence under Industrial Capital. Since trading activities can be linked to either source or profit, it is useful to begin with trading profits.

Individual trading profit arises whenever a commodity is re-sold at a profit. To the merchant who acquires a commodity for £100 and resells it for £200, it is his entrepreneurial ability to 'buy cheap and sell dear' which determines his gain (which covers trading costs and profit). But from the perspective of the system as a whole, the chain of transactions from initial to final sale simply serves to share out the total selling price among the various transactors, including the merchant. This holds true whether or not the transactions are fair or unfair, free or forced.

The merchant's gain is his 'balance of trade surplus'. But it is crucial to distinguish between a situation in which the overall 'balance of trade' is zero because the merchant's surplus is offset by a corresponding deficit somewhere else in the chain; and one in which the total balance is positive because the merchant's gain is merely his particular share in some overall surplus *whose origin therefore lies outside of trading activities themselves*. The former case corresponds to profit on the transfer of wealth, and the latter to profit on the production of surplus value. We will consider each in turn.

PROFIT ON TRANSFER OF WEALTH. A system-wide profit on the transfer of wealth appears mysterious because the surplus of the merchant does not seem to be counterbalanced by any corresponding deficit. Suppose merchant capitalists barter goods costing them £100 for those of a non-capitalist community or tribe, which they then resell for £200. This swap leaves the combined wealth of the participants unchanged. Yet

it gives rise to a profit on the capitalist side without any corresponding loss on the non-capitalist side, so that a net profit appears *for the system as a whole*. How is that possible?

The tribe's participation in trade may be motivated by fear, by ceremonial considerations, or by the hope of gaining objects which are socially more desirable. In all cases, it is a social assessment which stands behind the trade. But for the merchants, the important thing is that the tribal objects they acquire can be resold for a monetary gain. In Marx's terminology, the tribe is operating within the simple commodity circuit $C-C'$, in which one set of use-values C is exchanged for another useful set C' ; while the merchants are operating within the capital circuit $M-C-C'-M'$, where a sum of money $M = £100$ is ultimately transformed into a larger sum $M' = £200$, through the exchange of one set of use-values C for a more valuable set C' .

The above circuits form the two poles of the transaction. However, because only one of these poles is assessed in monetary terms, any monetary gain recorded there has no counterpart at the other pole. A net monetary gain can thus appear for the system as a whole. Note that this would not be the case if both poles were treated in the *same* terms. If the tribe's goods were valued at their final selling price of £200, it would be obvious that the tribe had exchanged a set of commodities worth £200 for another worth only £100, thereby losing in monetary value exactly as much as the merchants gain. In the end, it is *inequality of exchange* which underlies profit on transfer of wealth (profit on alienation) (Marx, 1863, ch. 1).

Interestingly, enough, neoclassical economics tends to treat profit as simply profit on alienation. This is why the analysis of 'pure exchange' occupies so prominent a position within the theory. For instance, a classic illustration depicts a prisoner-of-war camp in which all prisoners receive equal (Red Cross) packages of commodities. An entrepreneur among the prisoners then mediates a more desirable distribution of the total mass of commodities, a part of which he pockets as his own reward. Since the other prisoners all gain in terms of their respective subjective (and hence non-comparable) utilities, that portion of their collective endowment which is gained by the entrepreneur is not treated as their loss. On the other hand, for the entrepreneur it is precisely this transferred wealth which is counted as his profit. With one pole of the transaction in subjective utility and the other in material gain, profit seems to be created out of thin air. Instead of attempting to dissolve this false appearance, neoclassical economics concentrates on presenting profit as the just reward of the capitalist class (Alchian and Allen, 1969, chs. 1–4).

PROFIT ON PRODUCTION OF SURPLUS VALUE. With the rise of industrial capital, it became increasingly clear that industrial profit was quite different from profit on alienation. The latter was dependent on trade and unequal exchange, while the former was tied to production, wage labour, and apparently equal exchange (Meek, 1956, Ch. 1). It is exactly in order to locate the fundamental difference between the two that Marx insists on explaining industrial profit even when all exchanges are essentially equal (Marx, 1867, Ch. 5).

Marx begins by noting that every society must somehow direct the labour time at its disposal toward the production of the goods and services necessary to sustain and reproduce itself. In the case of class societies, the reproduction of the ruling class requires that it be able to extract a surplus product from the subordinate classes. This means that every ruling class must somehow get the subordinate classes to work beyond the time necessary to produce their own means of