A MARX-SRAFFA BIPARTISAN AGREEMENT (UPON DOING AWAY WITH THE VALUE-PRICE TRANSFORMATION)

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1. Introduction

The scholars who have tackled Marx's theory of value have generally based their analysis on a questionable premise. They have usually taken *all* three Volumes of Capital as being the final and definite stage of Marx's endeavour to describe the capitalist mode of production. However we should not forget that only Volume I was published by Marx himself in 1867, and that, even though the manuscripts for Volumes II and III had already been written, Marx never used them for further publication. We actually don't know the reasons for such an astonishing renounce of a lifelong analytical effort but it is however advisable not to give the same indisputable significance to Volumes II and III as compared to Volume I, particularly with reference to the well known transformation problem dealt with in Volume III. The solution of which appears to be in sharp contrast with the crucial aspect of the value theory, mainly outlined in Volume I and occasionally in Vol. III, which refers to the "socially necessary" labour-time as based on the peculiar market situation of the capitalist unplanned economy, and not – as is commonly thought - merely on "technical" conditions.

Should such contrast be proved right- and this is the subject to which I shall devote the following pages, - a century of learned, even passionate discussion concerning the "transformation of values into prices of production" ought to be reconsidered. Consequently, Piero Sraffa's (1960) contribution to the price theory (which I do not touch upon in this paper) might be seen not as an opposite stance as is usually stated but, on the contrary, as a complementary one to Marx's labour theory of value. By combining the two we may hope to achieve a full explanation of the capitalist mode of production.

[1] I wish to thank Paolo Leon and Angelo Reati for their helpful comments, while assuming full responsibility for any errors.

2. The Marxian theory and its "rigorous" mathematical versions

2.1 Paradox in, paradox out. Marx was no formal mathematician and therefore made no use of analytical methods in his "modelling" of capitalist economy. In order to achieve rigorous formulations he relied solely on his outstanding capacity of taking any amount of abstract thought in his analysis and of suggesting appropriate solutions in literary terms. However, in the second half of the 20th century a number of distinguished mathematical economists[2] have undertaken the task of developing Marx's model along the lines of modern methods. They have thus attained a level of logical rigour that Marx would have undoubtedly envied, although he might have been sceptical about the excessive confidence that these economists have attributed to some of their rigorous findings. In fact it is fairly obvious that using equations - which are hopelessly rigorous entities given that by manipulating their terms we cannot pull out of them anything better or worse than we had put into them right from the start - much care has to be taken to avoid that rigorous results may, notwithstanding, be deceitful ones. As nowadays wise programmers say, "garbage in, garbage out" or, as in our case we shall find, "paradox in, paradox out".

Therefore, to avoid misrepresentations of the Marxian value theory that might spill over into mathematical analysis, a few basic points have to be assessed.

(i) Marx developed his labour value theory in order to explain how, in spite of the fact that in the capitalist system the labour force, as any other commodity, is paid its "full value", nevertheless a "surplus value" is obtained when it is *used* in the production process. This is indeed the "arcane" he intended to unravel concerning a definite historical economic system, i.e., the capitalist mode of production, in which the one and only motivation of social production is surplus value (which is the source of profits) obtained by means of the exploitation of the labour power through surplus labour.

(ii) In the capitalist system private production has no necessary connection with the social needs since supply and demand are not brought together in a plan. Therefore they coincide only whenever the labour time expended proves to be "socially necessary". However by this expression - which was destined to become the crux of endless discussions among economists - Marx meant *two* different things. In the first place, as he stated in the opening pages of Capital, Vol. I, he meant "the labour time required to produce any use-value under the conditions of production normal for a given society and with the average degree of skill and intensity of labour prevailing in that society." (Marx, 1867-1894, Vol. I, p.129). Here, in other words, "socially necessary" signified the prevailing "technical" conditions which are independent from market transactions. In the second place, by "socially necessary", Marx meant instead the labour time required to satisfy social needs, as they turn up in the market. Accordingly the exchange value of commodities, based on this measurement of labour time, can never be quantifiable *in advance,* as is the case with the other technical conditions in the production process, for it comes into light only *after* the market transactions have taken place, and the "necessity" has indeed imposed itself socially.

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[2] Some of the outstanding ones are: Morishima (1973, 1978), Steedman (1977), Pasinetti (1977, 1981), Roemer (1981).

(iii) The "value system" was devised by Marx to explain social relations and the specific mechanism of exploitation underlying the capitalist mode of production. Therefore he considered such a system to be the inescapable "point of departure" for the explanation of capitalist economy, despite not being observable at its surface, where the "prices system" alone actually rules the market exchanges. However "values" have to be considered in some way as linked mutually to "prices" but here we find ourselves in difficulty because the explanations given for such relations, i.e., direct "transformation" of values into prices, initially by Marx himself in *Capital* Volume III and thereafter by recent theorists, are improper. For they assume that, contrary to the analysis of Volume I, values *can be known ex ante*, i.e., prior to market exchanges in order to draw from them the actual prices of production.

Condition (i) is simply the exploitation axiom requiring here no further explanation, while condition (ii) is seldom considered by economists and requires a supplementary comment which I will attempt in the following paragraph. It will then be possible to tackle briefly condition (iii) known as the "transformation" problem. (For a fuller account of these questions see Carandini, 2005).

2.2 The hidden meaning of "socially necessary" labour time. In the capitalist society, as previously mentioned, the division of labour into different productive branches does not depend on social needs or on a compelling plan. Marx's crucial assumption, throughout his analysis, is that the capitalist mode of production, in spite of being an unplanned and consequently *essentially anarchic* system, continuously faced by structural disequilibria, is however always striving for equilibrium between supply and demand. This is why the second meaning of a "socially necessary" labour-time, stated above, has to be considered the true basic one of the Marxian value theory. As Marx writes in *Capital*:

> The production of commodities must be fully developed before the scientific conviction emerges, from experience itself, that all the different kinds of private labour (which are carried on independently of each other, and yet, as *spontaneously developed branches of the social division of labour*, are in a situation of an all-round dependence on each other) are continually being *reduced to the quantitative proportions in which society requires them*. The reason for this reduction is that in the midst of the accidental and ever-fluctuating exchange relations between the products, *the labour time socially necessary to produce them asserts itself as a regulative law of nature*. In the same way, the law of gravity asserts itself when a person's house collapses on top of him. (Marx, 1867-1894, Vol.1, p. 168, my italics)

> While within the workshop, the iron law of proportionality subjects definite numbers of workers to definite functions, outside the workshop the play of chance and caprice results in a motley pattern of distribution of the producers and their means of production among the various branches of social labour. It is true that the different spheres of production constantly tend towards equilibrium, for the following reason. On the one hand every producer of a commodity is obliged to produce a use-value, i.e., he must satisfy a particular social need (though the extent of these needs differs quantitatively, and there exists an inner bond which attaches the different levels of need to a system which has grown up spontaneously); on the other hand the law of the value of commodities ultimately determines how much of its disposable labour-time society can expend on each kind of commodity. But the

constant tendency on the part of the various spheres of production towards equilibrium comes into play only as a reaction against the constant upsetting of this equilibrium. The planned and *a priori* system on which the division of labour is implemented within the workshop becomes, an *a posteriori* necessity imposed by nature, controlling the unregulated caprice of the producers, and perceptible in the fluctuations of the barometer of market prices. The division of labour within the workshop implies the undisputed authority of the capitalist over men, The division of labour within society brings into contact independent producers of commodities, who acknowledge no authority other than that of competition, of the coercion exerted by the pressure of their reciprocal interests, just as in the animal kingdom the «war of all against all» more or less preserves the conditions of existence of every species. (…) In the society where the capitalist mode of production prevails, anarchy in the division of labour and despotism in the manufacturing division of labour mutually condition each other (Marx, 1867-1894, Vol.1, p. 476-477, Marx's italics, my underlinings).

There is no necessary connection, however, but simply a fortuitous one between on the one hand the total quantity of social labour that is spent on a social article, i.e. the aliquot part of its total labour-power which the society spends on the production of this article, and therefore the proportion that the production of this article assumes in the total production, *and on the other hand the proportion in which the society demands satisfaction of the need appeased by that particular article*. Even if an individual article, or a definite quantity of one kind of commodity, may contain simply the social labour required to produce it, and as far as this aspect is concerned the market value of this commodity represents no more than the necessary labour, yet*, if the commodity in question is produced on a scale that exceeds the social needs at the time, a part of the society's labour-time is wasted, and the mass of commodities in question represents on the market a much smaller quantity of social labour that it actually contains* (Marx, 1867-1894, Vol. III p. 288, my italics).

Summing up the exchange value is actually determined by *two* factors: (i) the working-time which it is *socially necessary from the standpoint of the prevailing technical conditions* of a given productive sector; (ii) the working time which proves to be *socially necessary for the satisfaction of the demand* this commodity finds in the market.

It is precisely because producers do not know beforehand the quantity of the commodity they will be able to sell that the "exchange" value *is never given a priori* but is realised only *a posteriori*, as Marx himself argues in the previous quotation. It is in fact only following the transactions and the continuous adjustments and compensations carried out by the market, i.e., the overcoming of "the play of chance and caprice" and "the accidental and ever-fluctuating exchange relations", that a balance is achieved between the supply of labour-time on the part of commodity sellers and the effective demand for labour-time on the part of buyers. *Before* the exchange, and detached from its concrete occurrence, the exchange value of the commodity is purely hypothetical " because labour time as the measurer of value *exists only as an ideal*" (Marx, 1858, p.140, my italics).

Nothing could be more foolish than the dogma that because every sale is a purchase, and every purchase is a sale, the circulation of commodities necessarily implies an equilibrium between sales and purchases. *If this means that the number of actual sales accomplished is equal to the number of purchases, it is a flat tautology*. But its real intention is to show that every seller brings his own buyer to market with him. Sale and purchase are one identical act, considered as the alternating relation between two persons who are in polar opposition to each other, the commodity owner and the money owner….Hence the identity of sale and purchase implies that the commodity is useless if, when it is thrown into the alchemist's retort of circulation, it does not come out again as money; if in other words it cannot be sold by its owner and therefore bought by the owner of the money (Marx, 1867-1894, Vol. I, p. 208, my italics).

> Supply and demand always coincide if a greater or lesser period of time is taken as a whole; but they coincide only as *the average of the movement that has taken place* and through the constant movement of their contradiction. Market prices that diverge from market values *balance out on average* to become market values, since the departures from these values balance each other as pluses and minuses when their average is taken (Marx, 1867-1894, Vol. III , p.291, my italics).

In the second place, we need to be well aware of the fact that when Marx speaks of "social work" as a "measure of value", he does not conceive of it as a sum of the actual individual working times, from which to extract the sum of the total produced value. On the contrary:

> The total value produced divided by the number of products determines the value of the individual product and it becomes a commodity only as such an aliquot part. *It is no longer the labour expended on the individual particular commodity (in most cases, it can no longer be calculated, and may be greater in the case of one commodity than in that of another) but a proportional part of the total labour—i.e., the average of the total value [divided] by the number of products—which determines the value of the individual product and establishes it as a commodity* (Marx, 1863, Part III, Cap. XX, p. 113, my italics).

Finally, and to stress further that the law of value is only an "internal" law, i.e. *that it does not appear in external exchange relations*, Marx states the following:

> In this quite specific [capitalist] form of value, labour is valid only as social labour; on the other hand the division of this social labour (…) is left to the accidental and reciprocally countervailing motives of the individual capital producers. Since these confront one another only as commodity owners, each trying to sell his commodity as dear as possible, and seeming to be governed only by caprice even in the regulation of production, the inner law operates only by way of their competition, their reciprocal pressure on one another, which is how the divergences are mutually counterbalanced. *It is only as an inner law, a blind natural force vis-à-vis the individual agents, that the law of value operates here and that the social balance of production is asserted in the midst of accidental fluctuations* (Marx , 1867-1894, Vol. III, p.1020, my italics).

To sum up, exchange value:

a) is the purely ideal measure of the labour-time which should have been spent on commodities if it had been possible to know beforehand the total social need those commodities had to satisfy. And such "socially necessary" labour-time depends on the oscillating movements of supply and demand and therefore comes to light "from the average of their past movement" which is entirely fortuitous;

b) is given not by adding up the "actual" working-time employed on single commodities, which would no longer be calculable, but by the total "social" working-time employed divided by the different products;

c) being an abstract, ideal measure operating as an inner and hidden law of exchanges, it does not appear in the external relations and therefore cannot be computed on the same analytical plan as prices of production.

If these features are taken into account, we *cannot* legitimately assert that exchange values are measurable *a priori* and *separately* for *single* commodities or for *single* industries. And when, as in national accounting, it is possible to know the actual amounts of labour power that, in a definite period, have been used in a given industry or in the economy as a whole, it must be stressed that such amounts, being the "result" of transactions *already* occurred within the price system, cannot be taken at the same time as the "point of departure" to determine prices which is the role attributed to exchange values.

Yet this illegitimate procedure, while being against his own theory described in Volume I, was used by Marx in Volume III in an attempt to transform exchange values into production prices, and the values *one by one and a priori* were taken for granted. A costly mistake because it gave rise to a chain of misconceptions and contradictions which have been used as pretexts to invalidate his entire value theory.

2.3 The transformation riddle. We may now turn to the above mentioned condition (iii). The procedure Marx followed in the manuscripts for *Capital*, Volume III, in his attempt to carry out the transformation of values into prices of production, contains both errors of *substance* (he himself partly admitted this) and errors of *method*. Marx's critics have on the whole dealt with the substance, finding quantitative imprecision and incompleteness in his reasoning which invalidate his conclusions. The question I wish to raise here is different to that usually posed, i.e., whether the transformation of values into prices *works or not*. Should the interpretation advanced in the former paragraph be legitimate, an *error of method*, *posing problems of consistency with respect to the theory of exchange value described in Volume I*, renders the transformation of values into prices - but this time from the outset, before even considering the errors of substance - *inconclusive and erroneous*. This is a quite different stance from the one usually taken by economists [3].

In Marx's "transformation", as economists who are familiar with his value theory (and to whom this paper is mainly directed) are well aware, the rate of profit, to be determined, *presupposes the values* of the commodities which make up constant capital, variable capital and surplus-value. In short, these values have to be known *beforehand* if we wish to derive the rate of profit from the surplus-value divided by the sum of constant capital and variable capital. Marx's intention in Volume III was plainly to draw the magnitude of prices from values, putting both on the same technical-material level. However, this *material correlation,* meaning that we cannot *calculate* prices without *calculating* at the same time the values from which to derive the rate of profit, is unacceptable. Unfortunately, as we have made clear, given the anarchy of a capitalist economy *before the exchanges have taken place* labour time as a measure of value is only barely so as an "abstract" or "ideal" entity. It is therefore only *ex post* that the exchange values of all commodities are determined throughout the falling into equilibrium of supply with respect to demand.

[3] The only exception, if I am not mistaken, is that of Claudio Napoleoni (1976), a distinguished scholar of Marx and the theory of value. Napoleoni reached almost the same conclusions as this study, with an interpretation of the exchange value very similar to that touched upon in this paper.

This is the difficulty of overcoming the incongruity of the transformation method - by which exchange values have to be known to determine the rate of profit while the rate of profit itself has to be known to realize market exchanges thanks only to which the exchange values come to be subsequently determined. The method of calculating the rate of profit and the values *simultaneously* within a system of algebraic equations is no longer possible when a *time-lag* between the two is by definition impossible to avoid.

Instinctively Marx himself saw that, besides the incompleteness, there was also something more deeply contradictory in his attempt to give an explanation of prices of production based on values, and he wrote this annotation:

> The real difficult question here is this: how does the equalization [of the surplus value among capitals of different organic composition] lead to a general rate of profit, *since this is evidently a result and cannot be a point of departure*. To begin with, a monetary estimate of commodities obviously cannot be made unless it is *after they have been exchanged* and if we assume such an estimate, *we must regard it as the outcome of an actual exchange of commodity-value vis à vis commodity-value*. *But how does this exchange of commodities at their real value come about?* (Marx , 1867-1894, Vol. III, p.275, my italics)

We might say that these few lines of Marx's manuscript confirm the existence of the problems we have discussed in the previous paragraph. The price-value of the commodities is not actually knowable until "*after they have been exchanged*", as he himself admits, i.e., after the "*real exchanges of commodity-value vis à vis commodity-value*". Which, alas, never occurs in reality.

From now on I will call this "difficult question" raised by Marx himself, i.e., that of obtaining the rate of profit by a procedure that *is evidently a result and cannot be a point of departure*, the "value-profit trap" .

The scholars who in the 20^{th} century confronted the problem of transformation with theoretical instruments which were much more advanced than those available to economic science in Marx's time, do not seem to have been aware, on the whole, of this p*reliminary* problem of method. They have overlooked the purely "ideal" character of the labour time expressing exchange values and have made use of them in their equations on the same "real" plane as prices, i.e., as magnitudes calculable *a priori* and for each single commodity. *In other words they have disregarded the "behind the scenes" nature of values as compared to the "onstage" nature of prices*.

This kind of approach – through which, eventually, successful transformations of values into prices have been realized as in the case of Pasinetti (1977) - is however inescapably at odds with the value system conceived by Marx to explain the capitalist production of commodities by means of commodities and of surplus-value by means of exchange value within, I insist on this, *an anarchic and antagonistic society* entirely dissimilar from the one experiencing the "general economic equilibrium" described in the mainstream academic textbooks.

But it is now time to examine how the "value-profit trap" may create paradoxes which, by spilling over into mathematical analysis, obstruct the value analysis.

3. A counter Marx approach

3.1 A first paradox in and out. To start with condition (i) described in paragraph 2, the value theory has to be analysed with reference to the *capitalist exploiting system* and not an imaginary one, with the same class relations except that it produces not for the purpose of making profits but for the sake of consumption needs (as had been the case in previous historical periods, by and large). On the other hand, to describe a "capitalist" system where the entire net product goes to wages and therefore profit equals zero, is a fanciful operation which leads to this first "paradox in": rigorous analytical methods, based on the Marxian "value theory" which was wholly devised to explain the "capitalist" system, are used to portray a "non-capitalist" one.

As an example Screpanti (2003, p. 156) holds that Marx's "value magnitude axiom" establishes that

$$\lambda = \lambda \mathbf{A} + l \qquad (1)$$

where λ is a vector o labour values of gross outputs, i.e. of the labour quantities contained in them, $\mathbf{A}$ is a technical coefficient matrix, $\lambda\mathbf{A}$ is a vector of labour values of the means of production, and l is a vector of labour direct coefficients. This means that the labour value of the net products $\lambda(\mathbf{I} - \mathbf{A}) = l$ coincides with the quantity of labour contained in them. The solution to this equation is

$$\lambda = l(\mathbf{I} - \mathbf{A})^{-1}. \qquad (2)$$

Unfortunately equation (1) is fictitious since capitalists are not producing for the sake of consumption needs, but to make profits. Therefore it is absurd to imagine that the entire net product goes to wages contradicting the fundamental character of capitalist production. However, should this be the case, the quantity l would then include both the *necessary* labour and the *surplus* labour in spite of the fact that the latter is not denoted in equation (1). In fact, by a bizarre process which ought to be therefore defined as "self-exploitation by the working class", such surplus labour does indeed produce, in Screapanti's analysis, a surplus-value and he defines the *rate of exploitation in value terms, ρ*, as the *total labour - necessary labour ratio*

$$\rho = \frac{L - vL}{vL} = \frac{L}{vL} - 1 = \frac{1}{v} - 1 \qquad (3)$$

where L is the level of employment, v is the value of labour power, i.e, wage measured in labour values. Capitalists, as can be seen, play no part in all this. There is exploitation simply because the value of labour power vL is lower than the (whole net) value produced by it

$$vL < L \quad . \qquad (4)$$

In the capitalist system, however, commodities are not exchanged at their values but instead at production prices, p, that ensure a uniform profit rate, r. If w is the wage, production prices are calculated in the following way:

$$p = (1 + r)p\mathbf{A} + wl \qquad (5)$$

and the solution of this equation is

$$p / w = l[\mathbf{I} - (1 + r)\mathbf{A}]^{-1} \qquad (6)$$

This time the *rate of exploitation in price terms* is the *profit-wage ratio* σ, and is defined as

$$\sigma = \frac{py - wL}{wL} \tag{7}$$

which equals the rate of exploitation in value terms if $p/w = \lambda/v$. By comparing equation (2) $\lambda = l(\mathbf{I} - \mathbf{A})^{-1}$ and (6) $p/w = l[\mathbf{I} - (1+r)\mathbf{A}]^{-1}$ one immediately realises that this condition holds if and only if $r = 0$ and $w = v = 1$, i.e., *profit is nil* and the workers get the whole net product.

It is not surprising that what we see in the end is that the paradox "in" of Screpanti's description of a value system devoid of "capitalist" exploitation, generates the paradox "out" of its being analogous only to a price system where profits are equal to zero!

3.2 A second paradox in and out. As it has been pointed out by condition (ii), the exchange values of commodities are a kind of ideal quantity. Whenever this inner nature of values, as compared to the outer nature of prices, is overlooked, the alternative interpretation of the Marxian theory prevails, i.e., the interpretation of values as *sheer technical relationships*. Screpanti is, therefore, allowed to affirm that they "abstract from class relations" since equation (2), by which $\lambda = l(\mathbf{I} - \mathbf{A})^{-1}$, may be interpreted as showing "that knowledge of the technical coefficients is sufficient to determine labour values". In other words "there is no need to know anything about the institutional setting that regulates production, about the social classes that confront each other in the production process, about the way classes partition income and the working day. It is not even necessary to know it is a capitalist economy, in which one class earns profits and another wages. (…) Labour values are insensitive to social relations." (p.158).

In a recent paper Angelo Reati (2005) has criticized Screpanti's contentions, showing that labour values cannot be disconnected from the social contest. He claims that the production techniques that are adopted are not defined purely in terms of engineering data but are also the result of capitalist power relations that favour the selection of those techniques that best support the additional aim of controlling the labour-force. Thus, he asserts, " the input matrix **A** and vector *l* of direct labour that are used to compute labour values are at the same time technical *and social* data" (p.611).

I agree with Reati when, in opposition to Screpanti, he affirms that the labour theory of value is the most suitable foundation for a realistic and historically determined vision of capitalist society. My criticism, however, is based on a deeper disagreement about Screpanti's interpretation of values as technical data. In Marx's analysis commodities have a *dual* nature: they are at the same time *exchange* values and *use* values (potential technical tools), and the two of them will match if and only if the corresponding dual nature of the work-time expended on them, the abstract labour-time generating values and the concrete labour-time determining the utility of goods, are brought to coincide through the supply and demand mechanism. Now it should be clear that, being labour power a commodity by itself, to consider it under the sheer aspect of a technical tool implies that its *use* value is by no reason in question, whatever its *exchange* value might be following the uncertain market demand.

Here again the paradox "in" of considering labour power devoid of its dual nature makes unavoidable the paradox "out" of workers in the capitalist system conceived as mere physical instruments, whose use has nothing to do with class divisions, let alone with exploitation.

3.3 The third paradox in and out. There is another case in which the "value-profit trap" is at work, bringing a third paradox in and, unavoidably, out. In fact this happens whenever, by attempting to endow the transformation procedures with mathematical rigorousness, the behind-the-scenes value mechanism is unduly dragged onstage and analysed alongside to the price system, in spite of the fact that only the latter can be observed in reality.

Luigi L. Pasinetti is one of the outstanding scholars having undergone such an attempt of rigorously analysing the Marxian theory without, for his part, failing to take in due concern its basic features such as exploitation, i.e., the obtaining of surplus value through surplus labour (Pasinetti, 1977). However, simply by the fact that he establishes a value-price direct relationship, the contradiction previously described may be detected in his work, as I will now suggest.

Pasinetti's first move in tackling the transformation problem is to imagine an economic system whose "technique" is represented by a matrix of interindustry coefficients **A** and by a row vector of direct labour coefficients $\mathbf{a}_n$. He suggests (p. 122) that an "ideal" system of prices in which the whole net product goes to the workers and, therefore, capitalists reach no profit at all, might then be

$$\mathbf{pA} + \mathbf{a}_n w^* = \mathbf{p} \qquad (1)$$

where w^* is the "complete" wage rate absorbing the whole net product. By setting the price of an arbitrary *i*th commodity equal to unity the solution vector price is

$$\mathbf{p} = \mathbf{a}_n(\mathbf{I} - \mathbf{A})^{-1} w^* \qquad (2)$$

where the exchange ratios prove to be *proportional* to the quantities $\mathbf{a}_n(\mathbf{I} - \mathbf{A})^{-1}$ which, according to Pasinetti, "represent the "vertically integrated labour coefficients" or quantities of labour "embodied" in the corresponding commodities". By instead setting the wage w^* equal to unity and "explicitly denoting" the solution vector by **v**, equation (2) can be rewritten as

$$\mathbf{v} = \mathbf{a}_n(\mathbf{I} - \mathbf{A})^{-1} \qquad (3)$$

The exchange ratios, observes Pasinetti, "have now become *exactly equal* to the physical quantities of the embodied labour. It is precisely these quantities of embodied labour that Marx calls "values"." However he adds that Marx, in order to carry his analysis in terms of "values", focused his attention "on what is for him a *fundamental distortion* that occurs in a capitalist society. The owners of the means of production (the "capitalists") find themselves in a privileged position, which allows them not to pay the "complete" wage rate w^* " (p.123, my italics).

Accordingly, by posing **d** as the column vector of a set of quantities of commodities which constitute the real wage, and setting the wage value $\mathbf{vd} = \delta w^*$ where $\delta < 1$, the value system may be written as

$$\mathbf{vA} + \delta w^* \mathbf{a}_n + (1-\delta) w^* \mathbf{a}_n = \mathbf{v} \qquad (4)$$

Denoting by σ the ratio $(1-\delta)/\delta$ (what Marx called the "rate of surplus value", i.e., the unpaid part of w^* expressed as a percentage fraction of the part which is paid), Pasinetti obtains the "value system" $\mathbf{vA} + \mathbf{vda}_n + \sigma \mathbf{vda}_n = \mathbf{v}$, or

$$\mathbf{vA} + \mathbf{vda}_n(1+\sigma) = \mathbf{v} \tag{5}$$

which may be compared to the (this time fully capitalist) "price system"

$$(\mathbf{pA} + \mathbf{pda}_n)(1+\pi) = \mathbf{p} \tag{6}$$

These are but the premises on which Pasinetti has based his successful endeavour to solve, in analytical terms, the Marxian transformation problem by establishing a one-to-one correspondence between values and prices of production, reaching a conclusion which, he claims, "should no longer be open to dispute" (p. 149).

Pasinetti is right except that there is a hidden assumption which ensures that his solution is beyond question, i.e., the interpretation of the "socially necessary" labour time as determined only "technically", which I have questioned in the preceding paragraphs. As a prove of this assertion I will here make the following remarks.

(i) Equations (2) and (3), are meant to denote two different systems, the first of which having exchange ratios expressed in "prices" and the second in "values". Notwithstanding they are built on an identical set of analytical tools, such as matrix **A** and the vector of direct labour coefficients $\mathbf{a}_n$, both, on the whole, belonging to the input-output analysis of interindustry relations, originally developed by W. Leontief (1951) to provide an *ex post* picture of economic equilibrium.

(ii) Because of being defined *ex post*, the $\mathbf{a}_n$ coefficients "necessarily" correspond, one may say, to the "necessary" labour time *since demand has already matched supply*. Consequently, the above assertion that equation (3) expresses precisely what Marx calls "values" by showing that exchange ratios are exactly equal to the physical quantities of the embodied labour, is correct. The same can be said of the coefficients of matrix inputs and of direct labour expressed by equations (4) and (5) all of which are identifiable only *ex post*, that is *after* the market transactions have taken place and, thereby, supply and demand have of necessity coincided. Unfortunately *only prices* of equation (6) make those transactions possible and effectual and, therefore, what we have previously called the "value-profit trap" hinders right from the start the switch over from values of equation (5) to prices of equation (6). In fact the role of equation (5) is merely to explain social relations and class exploitation and is best located behind the scenes, where the invisible theatre-machinery is at work and the stage-lighting equipment makes the performance discernible.

(iii) Pasinetti's assertion that the quantities obtained by multiplying the *direct* labour coefficients $\mathbf{a}_n$ by the inverse matrix $(\mathbf{I}-\mathbf{A})^{-1}$ represent the quantities of labour totally "embodied" in the corresponding commodities, is problematic. He in fact claims that the elements of such inverse matrix, by contrast to those of the original matrix **A,** represent the *total*, i.e., *direct and indirect*, requirements of commodities for the production of final commodities. And thus, multiplying them by the $\mathbf{a}_n$ coefficients, it is possible to calculate the *total* amount of labour time employed in the previous rounds of production, i.e., the *total* value of the final commodity. It is however to be observed that the restrictive condition here unavoidably assumed of *constant technical coefficients*, is difficult to believe. By that condition the ascertained current “direct” coefficients of labour, in other words the labour time consistent with the “present” prevailing techniques, is being applied to “past” and “indirect” amounts of the other physical conditions used in the preceding productions obtaining what he calls the “vertically integrated labour coefficients”. On the grounds of the alternative interpretation of the labour value theory described in paragraph 2.2 and Marx’s own doubts concerning the chances of calculating values related to single past production processes, such definition may be considered implausible.

4. Conclusions

The final suggestion that almost naturally comes out from this unorthodox paper can be as concise and ironic as its recommended title: it is high time for a bipartisan strategy to be sought. In fact Marx, after all, would have probably welcomed Sraffa’s effort (1960) to establish a “price system” separately from his “value system”, freeing him from the painful transformation problem. On the other hand Sraffa explicitly abstained from posing himself as an adversary of Marx’s labour theory of value, while accepting that something like a class struggle takes place when the distribution between wages and profits is set before production prices. Accordingly it should today be accepted that without Marx’s theory no rational account can be given concerning the true nature of profit, and without Sraffa’s theory there is no explanation concerning prices of production which may definitely be related to the capitalist economic system, the one and only system producing “commodities” by means of “commodities”.

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