Production Prices Systems as derived from Labour Values Systems

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1. On the alleged redundancy calculation of labour values and production prices

The concept of redundancy of labour values and production prices comes from the idea that both of them can be deduced from the individual quantities of commodities involved in production as inputs and outputs and from labour power employed, and consequently, the "transformation" (from values to prices) is useless because prices can be calculated directly. Although it is true that prices are directly derived from proportions of commodities used, it is also true that we would have no indication of exploitation, which can in fact be observed through labour values only. It is, thus, a necessary step from a Marxian point of view. It is also needed for the Marxian approach to be able to base the prices on labour values for its concepts to be coherent and credibly closed. The conventional view of the "transformation problem" has been comparing a given labour values system, with its <u>resulting</u> weighted rate of profit, with a standard production prices system corresponding to the eigenvector of the Leontief matrix with a rate of profit which corresponds to its eigenvalue. This view shows that there is no possibility of matching the two Marxian equalities simultaneously: surplus value and profits, and total production in values and in prices.

There is, nevertheless, a first objection, which would undermine the suggested problem of redundancy: there is not enough justification for the selection of the corresponding rate of profit and relative production prices based on the eigenvalue and eigenvector[1]. Instead, it would seem more plausible (as we elaborate below) to use the industry rates of profit in labour values and the labour values as a departing point for these relative prices to be determined. At the same time, in relation with the redundancy concept, neo-Ricardian authors' express the idea that the Marxian rate of profit (as well as other categories as surplus value, etc.) and the rate of profit based on the eigenvalue are not related at all[2]. To some extent, this seems to contradict this redundancy concept. Instead, our approach assumes that there would not be such thing as redundancy because production prices would be more consistently developed from labour values.

2. Departing from labour values to arrive to production prices

The prices in Karl Marx (KM) are a construction based upon the labour values[3]. Commodities are the first concept discussed in Capital, but there is no coherent logical need for KM to depart directly from specific commodities in the calculation of production prices. KM legitimately departs for this purpose from the calculated labour values at the level of individual industry. This is so due to the general approach of KM, to whom, in every historic period, labour transforms nature with the available instruments to satisfy human needs, and the surplus, when exists (i.e. when labour employed is greater than the necessary labour needed to produce the goods and services for the workers' subsistence) is appropriated in different ways depending on the social conditions. To him, live labour is the only way to add new value and labour in general is the element that forms the exchange value of commodities. KM does not foresee a unit other than the unit of value (labour time) so as to allow a common rate of profit (eigenvectors or other vectors of prices, as well, as we will see below, accomplish such a function) There is, however, the important fact that a system of labour values can be expressed also

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[1] Piero Sraffa does not mention eigenvalues and eigenvectors in his works, unlike some followers.

[2] *"The rate of profit is not, other than by a fluke, equal to S/(C+V)".* Steedman [10] page 65

 "…"…it lacks theoretical significance to equate plus value with profits" (translated) . Vegara [11] page141

 Nevertheless according toBellofiore that would not be the view of Sraffa:"In his notes against Bortkiewicz, Sraffa insists that Marx's transformation is approximately correct, and that values must be taken as the starting point of the corrections." Bellofiore [1] page 11.

[3] A system where the measuring unit is labour time, both, for the material input and the labour force, as well as for the output produced.

in the form of a relative production prices system by calculating <u>individual industry rates of profit</u> with the capital employed and the surplus value produced in each industry. This would allow, afterwards, to calculate the corresponding prices (see below, section 3) and become a departing point for a production prices determination with one common rate.[4] The labour unit can still be maintained, due to the existence of different industry rates.

According to Sinha [8], Sraffian relative prices are "*completely constrained by the system of production and the condition of his reproduction*"; he adds that prices "*arbitrarily*" imposed from outside the system may exist with different industry rates of profit[5]. This is precisely the case we analyse and it consists in departing from individual industry rates of profit in value terms, in coherence with Marxian approach, to arrive to production prices. In our particular view, production prices are, hence, derived directly from values and this view is compatible with recognizing the existence of an <u>independent</u> production prices system.

3. Labour values as relative production prices based on individual industry rates. Conditions of equality and proportionality

Our approach is based in the two points considered before: first, expressing inputs and outputs in labour value terms[6] and, second, using the current industry rates of profit, also in labour terms, before these rates of profit have been equalized. We, then, elaborate the conditions of equality/proportionality of production prices and labour values and identify when and why the two equalities (total profit equal to total surplus value and total production prices equal to total value) differ.

KM, in [5], alleging simplicity, calculates what he calls the cost price of commodities (price of input commodities without including the corresponding industry profits) Once he has all the cumulated cost price and the global production price (hence, including the total surplus value) he calculates a common rate of profit that is applied, afterwards, to every industry according to the invested capital, thus, forming its production prices. However, they are not really production prices in the sense that, the change in industry values they represent, only apply to outputs but not to inputs.[7] It can be, nevertheless, argued, contradicting the KM procedure, that without introducing this aforementioned KM's simplification, labour values would be viewed as production prices (employed, both, in inputs and outputs). This would be the result of applying the <u>existing industry rates of profit</u>, derived from the fraction between surplus value and constant and variable capital employed in each industry, all measured in labour values (see example with three industries in formula (1) and see, also, Annex, for the meaning of symbols and data example). In this case - when there is no common rate of profit and, instead, the existing industry labour value rates of profit are used -, there is a complete equality between labour values and production prices: equality (2), directly deduced from (1). A further evidence that these prices really are production prices is calculating them employing the wage as a unit[8]. This results in prices being proportional to labour values - see (3), where the rate of surplus value is the factor of proportionality – These prices are always higher than values when the rate of

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$$P'_w = P'_w * \begin{pmatrix} a_{11} * (1 + r_1) & a_{12} * (1 + r_2) & a_{13} * (1 + r_3) \\ a_{21} * (1 + r_1) & a_{22} * (1 + r_2) & a_{23} * (1 + r_3) \\ a_{31} * (1 + r_1) & a_{32} * (1 + r_2) & a_{33} * (1 + r_3) \end{pmatrix} + L' * (1 + r)$$

P'w row vector of production prices in wage units, $(1 + r)$ diagonal matrix of rates of profit, L' row vector of labour force employed per unit of product.

profit is positive. This does also happen in the case we consider, where, even if no common rate exists, all industry rates are positive. The weighted rate of profit (Marxian rate of profit) continues to be the same in production prices terms.

$$P_1 = (\Lambda_1) = \left((\Lambda_1 a_{11} + \cdots + \Lambda_3 a_{31}) + \Lambda' B L_1\right)\left(1 + \frac{\left(\left(\frac{1-\Lambda' B}{\Lambda' B}\right)L_1\right)}{(\Lambda_1 a_{11} + \cdots + \Lambda_3 a_{31}) + \Lambda' B L_1}\right) \quad (1)$$

$$P' = \Lambda' \quad (2)^9$$

$$P_{1w} = \Lambda_{1w} a_{11} * \left(1 + \frac{1-\Lambda' B}{\Lambda' B}\right) + \cdots \Lambda_{3w} a_{31} * \left(1 + \frac{1-\Lambda' B}{\Lambda' B}\right) + \left(1 + \frac{1-\Lambda' B}{\Lambda' B}\right)L_1 \quad (3)$$

$$P'_w = \Lambda'\left(1 + \frac{1-\Lambda' B}{\Lambda' B}\right) = \Lambda'/\Lambda' B \quad (4)$$

$$P'_w = P'/\Lambda' B \quad (5)$$

It can be seen that the wage (measured in labour values) allows the conversion of prices (measured in wage units) into labour values (see (4)) or into prices (see (5)) and vice versa. There is a complete proportionality between the components of the labour value system and of the relative price system (measured in labour wage units), as well.

4. The double equality with a common rate of profit: "squaring the circle"

The production prices calculated with the above procedure will have to change if a similar remuneration to all capitals, based, for instance, on the weighted rate of profit (Marxian rate of profit) is to hold. Relative prices would have to be modified so as to maintain this rate of profit, and therefore, the same labour value[10] will have a different price according to the considered industry. Thus, the "problem" with transformation [7] becomes the calculation of a common weighted rate of profit. Arguing that KM has to "square the circle" of the double equality to close his system is nonsense. This can only happen under very special circumstances.

5. One or two Systems: autonomy and feedback between labour values and derived production prices

Deriving such a production prices system from a labour values system is also getting a relative production prices system, even before a common rate of profit exists. This prices system gets autonomy, because any change in wage, rate of profit or any price, produces a new realignment: a change in the rest of magnitudes. This autonomy could be deduced in KM [6][11]. This affects also the previously existing value system, because the new prices will change the wages in labour terms and the surplus value. All the components may evolve, regardless of the underlying values, depending on the relative structure of their system. Thus, there is a circularity of the values and prices systems. Devaluation, in a crisis, would be a process that comes unilaterally from prices to values. This effect of prices on values can be expressed as well as a new system of labour values and Marxian production prices. Hence, a new prices structure will originate a new labour values structure. One or two systems? In reality it is initially a unique system that becomes autonomous.

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[9] $\Lambda'=A'A+L'$

[10] Based in the unit employed so far.

[11] See Giorgio Lunghini, "**Marx before Sraffa**", for a discussion on the importance of chapter 50 in Capital volume III [3]

6. **No representation of labour intensity and working day extension in Ricardo and Sraffa analyses**[12]

KM says [13]: "[Ricardo] *He knows no change, either in the length of the working-day, or in the intensity of labour; consequently with him there can be only one variable factor, viz., the productiveness of labour; (2)[* in reference to: <u>(2.) Surplus-value and the value of labour-power vary in opposite directions. A variation in the productiveness of labour, its increase or diminution, causes a variation in the opposite direction in the value of labour-power, and in the same direction in surplus-value.</u>], *and this error vitiates his analysis much more than (1)[* In reference to: <u>(1.) A working day of given length always creates the same amount of value, no matter how the productiveness of labour, and, with it, the mass of the product, and the price of each single commodity produced, may vary.</u>], *he has not, any more than have the other economists, investigated surplus-value as such, i.e., independently of its particular forms, such as profit, rent, &c. He therefore confounds together the laws of the rate of surplus-value and the laws of the rate of profit.*"

And [14] *"In the period between 1799 and 1815 the increasing price of provisions led in England to a nominal rise in wages, although the real wages, expressed in the necessaries of life, fell. From this fact West and Ricardo drew the conclusion, that the diminution in the productiveness of agricultural labour had brought about a fall in the rate of surplus-value, and they made this assumption of a fact that existed only in their imaginations, the starting-point of important investigations into the relative magnitudes of wages, profits, and rent. But, as a matter of fact, surplus-value had at that time, thanks to the increased intensity of labour, and to the prolongation of the working-day, increased both in absolute and relative magnitude. This was the period in which the right to prolong the hours of labour to an outrageous extent was established the period that was especially characterised by an accelerated accumulation of capital here, by pauperism there."*

This means that the increase in the intensity of work or in the working hours, which increase the rate of surplus value, do affect the rate of profit in labour terms because the paid wage remains the same. These two factors allow to obtain and accumulate value that is not taken into consideration neither in Ricardo nor, afterwards, in Sraffa analyses. In contrast with their position, the total production can be extended with the same labour costs. Increasing the length of the working day is a normal practice under the existing capital mode of production. Hence, it is shown again that labour time, value and the rate of surplus value are essential elements in the economy. The extra surplus produced could be seen, finally, as an increase of profit and the rate of profit with a subsequent relative prices and wage change.

KM establishes a difference between the real wage, i.e., the price of the basket of commodities forming the wage (and, of course, their value) and the nominal expression of wage in monetary units[15]. He also considers that the increase of prices of necessaries of life (commodities) may be higher than the increase of the nominal wage. This would not allow the acquisition of the same amount of commodities as before. Even if, with Ricardo, the productiveness of agricultural labour decreases and its commodities prices increase, there is always the possibility of diminishing the wage to compensate the reduction of the rate of profit. It is also meant that there may be a force that keeps the level of the rate of profit from diminishing due to the wage increase, which is an effect not directly observable in the Sraffian system.

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[12] See Keith Gibbard, "**Marx on Ricardo on Time**" on this subject. [2]

13 In Capital, Volume I, Chapter Seventeen: Changes of Magnitude in the Price of Labour-Power and in Surplus-Value, Section 1 Length of the Working Day and Intensity of Labour Constant. Productiveness of Labour Variable.

14 In Capital, Volume I,. Chapter Seventeen: Changes of Magnitude in the Price of Labour-Power and in Surplus-value, Section 4, Simultaneous Variations in the Duration, Productiveness and Intensity of Labour

15The fact that Sraffa considers the wage as non advanced but rather paid post factum may be seen not only as a way to simplify the expressions but also as a mean to not represent wage only as a commodities basket whose value is automatically fixed by the prices system.

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Annex

Initial data			
Leontief I/O matrix, A			
a_{11}, a_{12}, a_{13}	0.30	0.20	0.20
a_{21}, a_{22}, a_{23}	0.10	0.10	0.00
a_{31}, a_{32}, a_{33}	0.10	0.20	0.05
L Labour employed in each industry (*per unit of product*)	1.00	0.10	2.00
B Wage goods *per unit of labour*	0.10	0.10	0.25
Sum of inputs in value	5.3561		
Variable capital	2.8938		
Constant capital	2.4624		
Sum of outputs in value	5.5624		
Individual values Λ'			
Λ_1	1.9452		
Λ_2	1.1023		
Λ_3	2.5149		
Rate of profit in value (Marxian)	0.0385		
Wage (*in value, per unit of labour*)$\Lambda'B$	0.9335		
Rate of surplus value (*1-$\Lambda'B$*) per unit of product	(0.0665=1-0.9335)		
Rate of surplus value $\dfrac{1-\Lambda'B}{\Lambda'B}$	0,0712		
Individual rates of profit in value			
r_1	0.0354		
r_2	0.0061		
r_3	0.0559		
Prices of production (in wage units) calculated with the previous sectoral rates:			
P_{1w}	2.0840		
P_{2w}	1.1819		
P_{3w}	2.6926		
Sum of new prices vector	5.9585		
Sum of price cost	5.7376		
Prices of production (in wage units) calculated with the Marxian rate (0,0385)			
P_{1w}	2.0907		
P_{2w}	1.2137		
P_{3w}	2.6482		
Sum of new prices vector	5.9539		
Sum of price cost	5.7331		
Rate of profit (eigenvalue)	0.043		
Sum of production prices eigenvector (in wage units) (2.11+1.23+2.66)	6		