

# Making Marx's Surplus Equation Work (Within Sraffa's Standard System)

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## Abstract

In this article, a solution is proposed to the problem of making Marx's Surplus equation work correctly, by using a version of it adapted to modern economics. In the end, the rate of profit in the economic system results to be ruled by labour exploitation and organic composition of capital, just as Marx had supposed, but this happens through ratios which only refer to Sraffa's Standard System, not the whole economy.

## Keywords

Marx, Standard Commodity

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## 1. Introduction: The Standard Commodity as a Philosopher Stone of Classical Economics (And Marxian Too?)

1) In a previous article (de Marchi, 2020a), it was argued that the Standard Commodity, the ingenuous theoretical instrument devised by Sraffa in order to solve the problem of finding an ideal measure of values put forth by Ricardo, perhaps would surprisingly prove to be a possible basis for setting up a Neo-Smithian economics, which may eventually usher a scientific revolution in Theoretical Economics (de Marchi, 2020b). The key for this unexpected result is in the nature that Sraffa attributed to his Standard Commodity: the recursive characteristic of the proportion between each layer of product and the previous layer of means of production encountered in the reduction of the Standard Commodity's final price into the prices of its layers of means of production, that Sraffa defines as the only necessary property of the Standard Commodity. Such recursive feature appears suddenly within the rigorous reasoning of *Production of Commodities by Means of Commodities*, with a twist which should have puzzled most readers of the book and instead seem to have been noticed by very few if

anyone.

2) In this new article, it will briefly be asserted that the Standard Commodity, along with the ideal economic system which purportedly generates it, the Standard System, could play a role as well as an “analytical *passepourtout*” for the long investigated issue concerning the existence of a relationship—postulated by Karl Marx—between the rate of profit, on the one hand, and the rates of labour exploitation and organic composition of capital on the other. In the Third Book of his *Das Kapital*, Marx proposed that values could be transformed into prices according to an equation in which the general rate of profit  $p$  would be determined by the ratio of the  $p\nu$  labour-value incorporated in the surplus accruing to capitalists over the labour-value of the total social capital, which is in turn equal to the sum of the variable capital  $\nu$ , i.e. the labour-value of the commodities necessary to reproduce the labour force, plus the  $C$  labour-value of the constant capital (namely the aggregate of fixed and circulating capitals). Marx’s surplus equation can be written down as:

$$p = p\nu / (C + \nu) \quad (1)$$

We know that, as such, Marx’s equation is wrong. Since  $p$  is determined simultaneously with the prices of commodities, it has to result as a ratio of the price of the surplus over that of social capital. And, generally, the labour-value of each commodity’s is determined by the its idiosyncratic production method and those of its (direct and indirect) production means, whereby the quantities of any two commodities do not exchange proportionally to their labour-values, nor do two of any aggregates of commodities, because they normally will be heterogeneous to each other. An exception to this rule, though, clearly holds for the relative prices of reciprocally homogeneous aggregates, namely aggregates made up by the same commodities taken in the same relative proportions. This consideration paves the way for the attempt, based on the theoretical concepts of the Standard Commodity & Standard System devised by Piero Sraffa (Sraffa, 1960), at circumventing in some way the difficulties encountered by Marx. Indeed, in Sraffa’s Standard System, the rate of profit might as well be determined as ratio between homogeneous quantities, provided that all the aggregates at play in the Marxian surplus equation are reciprocally homogeneous, each of them consisting of Standard Commodity.

## 2. The Key for a Settlement: Adapting Marx’s Formalism to Sraffa’s

A (so far apparently insurmountable) hurdle when trying to solve the puzzle have been the differences between Marxian formalism and Sraffian one. But it can be shown that such obstacles might be removed by

- 1) gradually fitting Marx’s formalism to the contemporary format, introduced by Piero Sraffa;
- 2) giving up the obsolete Marxian requirement that the surplus equation determining the rate of profit refers to the whole economic system (which cannot

be satisfied, as we said above, usually being the social surplus heterogeneous with respect to the capital, whereby the two do not exchange according to their labour-values), and, instead, correctly assuming that the relevant equation applies to the Standard System, where all the quantities could be expressed in Standard Commodity.

### 3. Solving the Puzzle

At this stage, the solution to the puzzles becomes almost obvious.

The equation written down by Marx is:

$$p = (pv - v)/(C + v) = ((pv - v)/v)/(C/v + 1) \quad (2)$$

i.e., the rate of profit  $p$  is supposed to be equal to the ratio between the rate of exploitation  $((pv - v)/v)$  and the organic composition of capital  $C/v$ , plus 1 (in the whole economic system).

Moving on to the Sraffian context, the rate of profit becomes  $r$ , and, within the Standard System, where the composite Standard Commodity is produced by employing itself as means of production along with labour: the total net product amounts to 1 and its labour-value is 1; whereby the labour-value of the labour force, which is paid for (in advance, following Marx) by the wage  $w$ , is equal to  $w$ , while the labour-value of the surplus is  $1 - w$ .

By replacing these symbols and expressions within the Equation (2) we have:

$$r = (1 - w)/(C + w) = ((1 - w)/w)/(C/w + 1) \quad (3)$$

Given the wage, Equation (3) is still indeterminate since whatever  $w$ ,  $r$  varies along with  $C$ . We can finally get rid of such Marxian symbol by posing  $w = 0$ , whereby the value of  $r$  results to be fixed at its maximum level  $R$ , corresponding to null wage. Therefore we have:

$$C = 1/R; \quad (4)$$

and:

$$r = (1 - w)/(1/R + w) = ((1 - w)/w)/((1/R)/w + 1) \quad (5)$$

In the end, the movements of the rate of profit for the whole economy are ruled by the trends of two rates within the Standard System: the rate of labour exploitation and the organic composition of capital. The only requirement for this assertion seems that also the wage is expressed in Standard Commodity, so that all of the three aggregates in Equation (5) exchange according to their own labour-values, being reciprocally homogeneous.

### 4. Conclusion

One should question whether or not this can be considered a solution for the problem Marx had in mind.

For an answer to such inquiry, first of all one must bear in mind that, as we have recalled above, *per se* that problem was unworkable, being wrongly defined.

Besides being the solution unachievable, after Sraffa we know that the only commodities whose production conditions are relevant for the determination of the rate of profit are a subset of those producing the social product: those whose production conditions are described by the group of independent equations determining the prices and rate of profit for the whole economic system. Therefore, we have necessarily to settle for a realistic solution, in which the only requirement is that the wage must be expressed in Standard Commodity.

If such criterion is deemed as too abstract, we might as well interpret Equation (5) by considering it as an expression determining the rate of profit through a ratio between two *quantities of labour-commanded* within the Standard System: the labour-commanded by its surplus  $((1-w)/w)$  over the labour-commanded by its capital  $((1/R)/w+1)$ .

This way—following Sraffa's analysis—Karl Marx's investigation, even if it was initially undertaken on mistaken bases, may lately prove to have pointed towards a somewhat meaningful problem.

For, a direct relationship will exist between the rate of profit and a quantity of labour the capitalists appropriate/command, and an inverse relationship will hold between  $r$  and the trend of the labour commanded by the constant capital over time (connected to technological change). These relationships hold within the Standard System, but this may not be a crucial limitation, because, after all, they are the only ones for which a consistent solution can be worked out.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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