The New Interpretation of Sraffa's Prices and its Critics

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I

Let us consider Sraffa's economic system that has produced a surplus:

90t. iron + 120t. coal +   60qr. wheat + 3/16 labour → 180t. iron
50t. iron + 125t. coal + 150qr. wheat + 5/16 labour → 450t. coal   I
40t. iron + 40t. coal + 200qr. wheat + 8/16 labour → 480qr. wheat

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180t. iron + 285t. coal + 410qr. wheat + 1 labour → 180t. iron + 450t. coal + 480t. wheat

And in terms of its price equations the system is represented by:

$(90P_i + 120P_c +   60P_w) (1 + r) + 3/16 \, \omega = 180P_i$
$(50P_i + 125P_c + 150P_w) (1 + r) + 5/16 \, \omega = 450P_c$ I'
$(40P_i +   40P_c + 200P_w) (1 + r) + 8/16 \, \omega = 480P_w$

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$(180P_i + 285P_c + 410P_w) (1+R) + \omega = 180P_i + 450P_c + 480P_w$

The received Sraffian position maintains that Sraffa's equation system **I'** satisfies the following two conditions simultaneously: (a) the uniformity of r across the three industries in **I'** implies that the system is in equilibrium, i.e., the supplies of each industry are assumed to be equal to their 'effectual demands' and (b) this does not entail an assumption of constant returns to scale (CRS from now on). It is my contention that both (a) and (b) cannot be claimed at the same time.

The reason for it is simple. If Sraffa's production system **I** is derived from observation of a system of production 'after the annual cycle of production', as Sraffa claims, then it cannot be argued that the system must be in equilibrium, since it is accepted by all, including the Sraffians, that it is only by a fluke that an empirical or 'actual system of observation' can be found to be in equilibrium at any moment. Thus

the Sraffian position must reject the contention that system **I** represents any given 'actual system of observation'.

That leaves us with the question: where from Sraffa gets his data of system **I**? Sraffians contend that somehow the 'effectual demand' quantities at any moment could be found out (e.g., Garegnani, 1990a,b,c, contends that it could be taken to be the average output of 'last several years') and given those 'effectual demand' quantities, Sraffa could simply *assume* that his output quantities are equal to those known 'effectual demand' quantities. But the problem still remains. Even if we grant that the 'effectual demand' quantities are known, which in itself is a very difficult proposition to accept, we still do not know how Sraffa could find the input data that goes with those 'equilibrium' output quantities. If the input data are also derived by taking the 'average' of inputs used in the 'last several years' (on the assumption that no perceptible technical change has taken place during these years—another highly problematic assumption) then it implies taking on board the assumption of CRS any way. The point is simple, unless one claims to know the production functions, i.e., the relation of inputs to every output changes, as in the neoclassical economics, one has no way of associating a set of inputs to 'given output quantities', unless those output quantities are the observed empirical quantities. Since Sraffa explicitly denies knowledge of production functions, the Sraffian position ends up in a hopeless contradiction.

The Neoclassicists (e.g., Samuelson 1990), on the other hand, accept (a) and reject (b). They argue that Sraffa must implicitly assume CRS. If one grants CRS to Sraffa's system of equations then it can be argued that the data of Sraffa's system **I** are observed data and even if this observed system is not in equilibrium, as long as CRS is assumed and no substitution of technique is possible, the equilibrium price solutions of this system of equations are independent of demand considerations (Samuelson 1951).

This position is internally consistent. It, however, cannot be accepted as a faithful interpretation of Sraffa's position, as it flatly contradicts Sraffa's claim that he does not assume CRS. Samuelson (1990) tries to get around this problem of interpretation by suggesting that Sraffa did not fully understand what he meant by

'constant returns'. He argues that Sraffa did not distinguish between the assumptions of 'constant cost' within the partial equilibrium framework of Marshall, which is what he meant to deny assuming, from the assumption of CRS within a general equilibrium framework. In Sinha (2007, 2010) I have shown that this hypothesis of Samuelson is incorrect. It is clear from Sraffa's unpublished notes that he was well aware of the distinction from early on. Thus the Neoclassical interpretation must be rejected.

This leaves us with two options: either we accept that CRS must be introduced as an essential assumption of Sraffa's theory to 'make sense of it', in spite of Sraffa's explicit denial; or a third way out should be found. Since 2009 (see Sinha and Dupertuis 2009a,b, Sinha 2010, Sinha 2012, Sinha 2013) I have been suggesting a third way out, which I think is a discovery of Sraffa's own position.

My position rejects (a) and accepts (b). It argues that Sraffa's equations are the description of an observed empirical system 'after the harvest', which is most likely not in equilibrium; and that uniformity of r in his equation system **I'** is a logical corollary of Sraffa's two conditions: (i) that the 'commodity-money' wages are given from outside and are uniform throughout the system (or the given total 'money' wages from outside is processed in the system in such a way that a unit of labour is defined as receiving equal wages) and (ii) that prices are determined internally by the equation system. This result, I argue, would have become apparent to Sraffa after his discovery of the Standard system and the Standard commodity in 1944.

For example, Let us take our empirical system I:

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90t. iron + 120t. coal +   60qr. wheat + 3/16 labour → 180t. iron
50t. iron + 125t. coal + 150qr. wheat + 5/16 labour → 450t. coal        I
40t. iron +   40t. coal + 200qr. wheat + 8/16 labour → 480qr. wheat
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180t. iron + 285t. coal + 410qr. wheat + 1 labour → 180t. iron + 450t. coal + 480t. wheat
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And in terms of its price equations without the assumption of equal rate of industrial profits the system is represented by:

$$(90P_i + 120P_c + 60P_w)(1 + r_i) + 3/16\ \omega = 180P_i$$
$$(50P_i + 125P_c + 150P_w)(1 + r_c) + 5/16\ \omega = 450P_c \qquad \text{I''}$$
$$(40P_i + 40P_c + 200P_w)(1 + r_w) + 8/16\ \omega = 480P_w$$

$$(180P_i + 285P_c + 410P_w)(1+R) + \omega = 180P_i + 450P_c + 480P_w$$

In this system, prices cannot be determined unless the rule for distribution of the surplus is known. Sraffa asserts that the industrial rates of profits *must* be uniform. If that is so then given wages, the two relative prices and the uniform rate of profits of the system could be simultaneously determined. It has been almost universally interpreted that Sraffa's claim that the rate of profits must be uniform is an admittance of the competitive equilibrium condition or the condition of the centre of gravitation (see John Hicks for an exception)[2]. Without going into exegetical arguments that Sraffa did not think in terms of equilibrium of demand and supply, I here motivate a logical argument behind the condition of the uniformity of the rate of profits independently of the notion of equilibrium of demand and supply. Below I show that if wages are taken to be fixed from outside and are taken to be uniform (or the heterogeneous labours are homogenised by the given wage differentials, as in Sraffa's examples) then a logical corollary of it is that prices must be such that all industrial rates of profits *must* be equal in any system of basic goods[3], as long as prices are determined by the system of equations and not taken to be fixed from outside.

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[2] 'Sraffa leaves us to find out what his prices are, but I doubt if they are equilibrium prices. They seem to be prices which are set upon products, by their producers, according to some rule. Now it is perfectly true that we are nowadays familiar with that method of price-fixing, by 'mark-up'; but when that method is used, the rate of profit that is used to establish the mark-up is conventional. Now it may be that Sraffa wants us to think of his rate of profit as being conventional; and that the uniformity of the rate of profit throughout his system, of which he makes so much, is just a uniformity of convention' Hicks (1985, p. 306). Among the Sraffians, Roncaglia (1978, p. 16) did appreciate that 'there is no reason to believe that Sraffa's prices of production should equate quantity demanded and quantity supplied;' however, he did not manage to show how then Sraffa could take the rate of profits to be uniform and thus succumbed to holding the contradictory position that Sraffa's system was 'a photograph of the market place' [an expression Sraffa uses in his unpublished notes of the period 1927-31] as well as his system was assumed to be at the centre of gravitation (also see Roncaglia 2000).

[3] A basic good is a good that inters directly or indirectly as input in the production of all the commodities, whereas a non-basic good does not inter directly or indirectly in the production of any basic good, though it could inter as input in the production of the subset of non-basic goods.

The proof of the above proposition is simple. Let us assume that wages are fixed at zero, then in the equation system-I'' we have three independent equations and five unknowns—two relative prices and three industrial rates of profits, given $\omega = 0$. Unless two industrial rates of profits are given, we cannot determine the two relative prices from within the equation system. But the rates of profits cannot be given independently of prices as they are dependent on prices. Can we, however, determine the average rate of profit of the global system (i.e., R) from the given information, instead of determining the individual industrial rates of profits? The answer is: yes. Because, whatever turns out to be the average rate of profit, the mathematical property of the average ensures that it can be equally distributed over the total capital. Therefore, if we *assume* that all the rates of profits were equal then it reduces the number of unknowns to three and we could determine this rate of profit, which must be equal to the average rate of profit R. The point to note is that we do not know whether this average rate of profit is equally or unequally distributed in the system and therefore, we still do not know whether the prices associated with equal rate of profits hold in the given real system or not. To solve for the industrial rates of profits and prices we need to convert our system of equations to its Standard counterpart.

Let us assume an imaginary system given by:

120t. iron + 160t. coal + 80qr. wheat + 1/4 labour → 240t. iron
40t. iron + 100t. coal + 120qr. wheat + 1/4 labour → 360t. coal   **II**
40t. iron +   40t. coal + 200qr. wheat + 2/4 labour → 480qr. wheat

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200t. iron + 300t.coal + 400qr. wheat + 1 labour → 240t. iron + 360t. coal + 480 wheat

And in terms of its price equations, the system is represented by:

$(120\,P_i + 160\,P_c + 80\,P_w)(1 + r_i) + 1/4\,\omega = 240\,P_i$
$(40\,P_i + 100\,P_c + 120\,P_w)(1 + r_c) + 1/4\,\omega = 360\,P_c$ **II'**
$(40\,P_i + 40\,P_c + 200\,P_w)(1 + r_w) + 2/4\,\omega = 480\,P_w$

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$(200\,P_i + 300\,P_c + 400\,P_w)(1+R^*) + \omega = 240\,P_i + 360\,P_c + 480\,P_w$

System-II is nothing but Sraffa's Standard system to the given empirical system-I. It redistributes the total labour of the system or rescales the real system in such a way

that the aggregates of its inputs and outputs come out in the same proportions. Let us again assume that wages are zero, then in the above given example of system-II', it is clear that the rate of profit of the system as a whole, i.e., R* is equal to 1/5 or 20%. This is because in this case the ratio of the aggregate physical net output to the physical aggregate inputs can be known without the knowledge of prices since it is a ratio of heterogeneous goods made up in the same proportion. This ratio is completely independent of prices—no matter what prices prevail, it will not affect the global rate of profit (i.e., R*) of the *Standard system*. It is, however, a mathematical property of the Standard system that R* is always equal to the average rate of profit (R) of the real system, as derived above. Since the individual equations of system-I' and system-II' are the same they are equivalent equation systems and every rescaled system generated from the given Standard system must also be equivalent to the real system and therefore their average rates must also equal R*. However, since all these equivalent systems have different industrial weights in their total, it is clear that R will always be equal to R*, if and only if, all the r's in system-I' must be equal.

Now we drop the assumption that wages are zero. Let us define a money commodity as a composite commodity made up of the three basic goods in the same Standard proportion, say we define: $(40P_i+60P_c+80P_w) = 1$. This is our Standard commodity. If now we give wages in the Standard commodity, then for every given wages from 0 to 1 we can discover the average rate of profit of the Standard system (R*) associated with those wages independently of prices, as R* is directly determined by the physical ratios. The relationship between the wages in terms of the Standard commodity (ω) and R* is given by: $R^* = R^*_{max}(1-\omega)$. This relationship is a structural property of the system of equations. It proves that the distribution of income between the two classes in terms of wages and the rate of profits on total capital is independent of prices. The point to note is that the system of equations does not admit any other distribution of income. As we have shown above, since the empirical system-I is nothing but an equivalent system of the Standard system-II, as their size and equations are the same but only arranged in different proportions, this relationship between R and ω

must apply to the empirical system-I as well.   This implies that as long as wages are given in terms of the Standard commodity, R* must be equal to R and therefore all the industrial rates of profits in the empirical system must be equal for all given ω.

In Sinha (2012) I provide evidence from Sraffa's writings (both from his book as well as from his notes) that supports my explanation of the uniform rate of profits in Sraffa's equation system. I also provide several quotations from Sraffa that show that Sraffa did not assume his system to be in equilibrium. Among those examples, one is most intriguing: In 'Appendix B' of the book, Sraffa (1960) discusses a case of a non-basic good, 'beans', which uses a very large proportion of itself in its production, e.g., 100 units as input per 110 units of output. In this case the 'bean' industry cannot admit a rate of profit greater than 10 per cent. Sraffa discusses the problem with the assumption of positive prices for all goods in this case when the rate of profits of the basic goods industries is higher than the one the beans can admit. This problem, however, cannot arise if the system was assumed to be at the centre of gravitation, as the gravitation mechanism would ensure that the bean industry disappears in the process. Furthermore, I critically discuss the alleged evidence generally cited by the Sraffians in support of the received interpretation and show that they don't support their case.

Unfortunately, Kurz (2012) in his recent criticism of my paper (Sinha 2012) does not engage with the merits of my arguments at all. Instead, he declares my position to be 'simply false' on the basis of a few quotations from Sraffa without any regard to their dates or contexts or even the meaning of what Sraffa says in those quotations. In the next two sections I examine his case against my position.

II

In Sinha (2012) I argue that 'Sraffa's prices are completely independent of demand considerations or the condition of equilibrium of demand and supply' (Abstract, p. 1323). I also argue that the received interpretation of Sraffa's prices 'involves reasoning in terms of counterfactuals. Sraffa, however, consistently refrains from counterfactual reasoning' (p. 1335). In his comment on my paper, Kurz (2012) asserts that both my

claims are 'simply false' and then goes on to add that 'While Sraffa rejected the *marginalist* theory of demand and supply, it was of course clear to him that "effectual demand" and thus gross output levels matter in ascertaining prices and the unknown distributive variable' (p. 1566). I begin, in this section, with an examination of his evidence provided in support of this claim and then consider the issue of 'counterfactuals' in section **III**.

Kurz provides five examples as evidence, four from Sraffa's unpublished notes and letters and one from the book, *PCMC*.

Kurz's Evidence: Item 1

> They are not necessarily the ratio, in which exchange will actually take place in any community in which *the quantities of things respectively used in production (i.e. consumed) and produced* satisfy those equations: such actual ratios of exchange are also conditioned by such things as legal institutions, etc. which vary in different organizations of society and which are 'arbitrary', i.e. irrelevant, from our present point of view. (D3/12/5:2, Kurz's emphasis)

Kurz's Evidence: Item 2

> This paper deals with an extremely elementary problem; so elementary indeed that its solution is generally taken for granted. The problem is that of *ascertaining the conditions of equilibrium of a system of prices & the rate of profits*, independently of the study of the forces which may bring about such a *state of equilibrium*. Since a solution of the second problem carries with it a solution of the first, that is the course usually adopted in modern theory. The first problem however is susceptible of a more general treatment, independent of the particular forces assumed for the second; & in view of the unsatisfactory character of the latter, there is advantage in maintaining its independence. (D3/12/15: 2, Kurz's emphases)

Kurz's Evidence: Item 3

> In a note composed on 20 February 1955, he wrote about his equations: 'It may be noted that they do not represent only the cost of production: they equally show *the use, or disposal, of each product*' (D3/12/2: 31, Kurz's emphasis).

The first two items as evidence are from the period before the discovery of the Standard system—item 1 is from the period 'Winter 1927-28' and item 2 is from the

year 1942.[4] Therefore, they cannot make a case against my interpretation, which rests on the claim that *after* the discovery of the Standard system in 1944 Sraffa must have realised that he no longer needed the 'equilibrium condition' for a solution of his price equations. Actually, in Sinha (2012, 1325ff.) I do point out that before 1944 Sraffa thought that he needed the 'equilibrium condition' for the solution of his equations even at the cost of taking CRS on board; though he had rejected the 'gravitation mechanism' because it entails the subjective notion of 'inducement'.

His evidence: item 1 and item 3 entail statements by Sraffa relating to a subsistence economy—a crucial fact Kurz does not bring to attention of his readers. In a subsistence economy all consumption is, by definition, 'productive consumption', i.e., consumption required by the system of production such as the feed for the horses. Therefore, no notion of 'demand' exists in such cases. That is why the word 'demand' does not appear in the quotations provided by Kurz. What appear in the quotations are 'use' and 'disposal' instead. These examples are simply irrelevant to Kurz's case in his own terms, since his case relates to 'ascertaining prices and the unknown distributive variable' (Kurz 2012, 1566). What 'unknown distributive variable' could exist in a subsistence economy?

This leaves us with two remaining items of evidence.

Kurz's Evidence: Item 4.

> And it will surely not have escaped Sinha's attention that in Sraffa's book, in the context of joint production (with two products), Sraffa stressed that typically 'two methods of producing them in different proportions will be necessary for obtaining the *required proportion* of the two products through an appropriate combination of the two methods' (1960, p. 43, n. 2, Kurz's emphasis).

Yet again, the meaning of the critical phrase 'required proportion' is obscured by elision.

The quotation begins with:

> Incidentally, considering that the proportions in which the two commodities are produced by any one method will in general be different from those in which they are required for use, the existence of … (Sraffa 1960, p. 43, f.n. 2)

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[4] This quotation is also used by S.M. Fratini (2011) to dismiss my case.

Again, the word 'use', as in items 1 and 3, refers to only 'productive consumption' and not demand in general. Have economists, including Kurz, ever used the phrase 'required for use' in place of 'demand'? The answer surely is: no. So why should anybody think that Sraffa would use such an akward phrase for demand? If he was worried about the word 'demand' being confused with 'demand functions' of the neoclassical economics, he could easily use words such as 'effectual demand' or 'quantity demanded'. In fact, in Dupertuis and Sinha (2009) we quote this passage and explicitly point out that the usual interpretation of Sraffa's expression 'required for use' or 'required proportion' as final demand is incorrect.

Kurz's Evidence: Item 5.

> And after the book was published, Sraffa in a letter dated 9 December 1964, wrote to the Indian economist Arun Bose, who had contended in a paper sent to Sraffa that in the latter's equations consumers' demand plays a 'purely passive role': 'Never have I said this ... Nothing, in my view, could be more suicidal than to make such a statement. You are asking me to put my head on the block so that the first fool who comes along can cut it off neatly—Whatever you do, *please* do not represent me as saying such a thing' (C32: 3).

To the best of my knowledge, this letter was brought to public attention for the first time by myself (see Sinha 2007). It actually refutes the position Kurz attributes to Sraffa. In the first paragraph of the letter (i.e., the part Kurz paraphrases), Sraffa writes that Bose is incorrect in attributing to him the position that 'It is a basic proposition of the Sraffa theory that prices are determined exclusively by the physical requirements of production and the social wage-profit division with consumers demand playing a purely passive role'. Yet, this is the position that both Garegnani and Kurz hold. And this is also the position of David Ricardo (in the context of gravitation). What happens when demand shifts from wool to silk in Ricardo's example? The 'natural prices' of wool and silk settle back to their old prices with supplies adjusting to their new demands, i.e., demand plays only a passive role (1951, p. 91). But why is this position so problematic for Sraffa? Because it implies the assumption of CRS—an assumption Sraffa emphatically denied making in his book. That is why attributing such a position to him would mean 'asking [him] to put his head on the block so that the first fool who comes

along can cut it off neatly'. It should be noted that the word demand appears only once in Sraffa's entire book, and that also to argue that the use of the word 'demand' would be inappropriate in that case. [5]

This is all the evidence that Kurz could muster against my interpretation of Sraffa's prices. I leave it to the reader to judge the strength of his claim that '[t]he evidence put forward should suffice to see that it is pure fiction to contend, as Sinha does, that the system from which Sraffa begins his investigation into its mathematical properties is not characterised by a balancing of effectual demands and levels of outputs' (Kurz 2012, p. 1566).

But there is, in fact, additional evidence—I would say irrefutable—in support of my thesis from a draft 'Preface' Sraffa wrote for the *PCMC* in 1957. Since the book was complete by 1957 for all practical purposes, it is certain that Sraffa was by then well aware of what he had accomplished in his book:

> This is not proposed as a complete system of equilibrium. The data assumed are not sufficient to determine either distribution or values. Only the effects of hypothetical, arbitrarily assumed extra data (such as wages, or the rate of profits) are discussed. … It is offered as a preliminary and there is no a priori reason why, on the basis of it, an equilibrium system should be built: there is some room left for it, as this is confessedly indeterminate; but the question is whether there is room enough for the marginal system. (D3/12/46: 20, dated 2.4.1957)

Here Sraffa explicitly states that his values are not 'equilibrium' values—these are simply 'effects' of 'assumed extra data such as wages'. He has constructed a system that shows the logical connections between certain economic categories, which in the book (Sraffa 1960) is given by the famous formula: $r = R(1-\omega)$; values or prices must be such that this relationship always holds—they are simply the 'effects' of this mathematical relation. The book is offered as a 'preliminary' to the question: is there 'room enough for the marginal system' in this system of relations? Now the critique could begin by

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[5] In 2003 Professor Garegnani had invited me to 'Centro Sraffa' at Roma Tre to spend a week there and give a couple of seminars. On this occasion I showed him Sraffa's letter to Bose. Garegnani immediately knew that this letter did not support his position. He told me that he did not understand why Sraffa had reacted to Bose in that way. A few minutes later he came back to tell me that 'perhaps Sraffa was particularly in a bad mood when he wrote this letter'.

checking whether there is enough room for the marginal system in this structure. If there is not enough room, then the marginal system must be rejected. This is why the book is a 'prelude to a critique'—the exact point made in my paper (Sinha 2012).

III

We come now to the question of 'counterfactuals'. Kurz claims that my own and also Amartya Sen's (2003) contention that Sraffa refrains from counterfactual reasoning is 'simply false'. The apparent evidence in support of this claim is a quotation from Sraffa's notes of the period 1928-31:

> The question asked of the theory of value is the following: Given (from experience) the prices of all commodities … find a set of conditions that will make these prices appear to be necessary. This means, given the unknowns, find the equations (i.e. the constants) … But this is the general question, the problem of finding the theory of value: when it is solved, once and for all, the particular questions asked are the reverse, i.e. given the constant equations, *if the value of one of the constants is varied, how are the resultant prices determined*? But of course this is only a matter of calculation. (D3/12/9: 65, Kurz's emphasis)

Interestingly, Kurz would like his readers to read Sraffa's expression, 'Given (from experience) the prices of all commodities …' as 'prices of all commodities that most likely will never be experienced'. Because if Sraffa's prices were the prices that would hold at the equilibrium, as Kurz contends, then it is accepted by almost all that those prices could hold at any moment only by a 'fluke' (to use Garegnani's (2012) expression); so how could something that almost certainly does not exist be taken as 'given' and that too 'from experience'?

The fact that the prices Sraffa refers to above are 'actual' prices would have been crystal clear to the reader if Kurz had not left out a few words after the 'commodity' in the above quotation. The complete sentence reads: 'Given (from experience) the prices of all commodities *at one moment*' (emphasis added),…

So the problem Sraffa is setting up for himself is this: at a moment a set of prices exist, find out the conditions that would make the appearance of these prices necessary. Once the equations are discovered that make the appearance of these prices necessary then the effect of a change in a constant of the equations (such as wages) on these

prices is only a matter of 'calculation'. And this is what Sraffa finally succeeds in achieving in his 1960 book, as I explained in my paper (Sinha 2012). Sraffa's (1960) prices are the empirical prices that must hold given the empirical production equations and wage rate from outside the system. Now different wages would affect prices in a similar way as changes in two angles of a triangle of Euclid would affect the third angle—this is simply a matter of 'calculation'. If the relationship between wages and the set of prices was of the nature of mechanical causation, as Kurz contends, then it cannot be 'only a matter of calculation' as one will need to take into account, at the very least, the effect of changes in wages on demands and thus outputs, which would bring into play the knowledge of returns to scale etc.—it can by no means be only a matter of 'calculation'. A relationship of causation (to use Sraffa's expression) is never 'only a matter of calculation'. In a note written on 7.8.42, Sraffa wrote:

> [A possible confusion: The Q of L may, of course change as an <u>effect</u> of a change in wages: this is a causal connection, which may or may not exist. But the other things' change is <u>implied</u> in the change in wages: this is a logical connection. …
> (D3/12/16: 13)

By this time Sraffa had already read enough of quantum mechanics to know that the classical notion of causality is, strictly speaking, wrong; and that no exact prediction of a future event is possible—all one can predict is the frequency distribution of the future outcomes.

Now I leave it to the readers to make up their own minds as to who has a more convincing interpretation of Sraffa.

References

Dupertuis, M.-S and A. Sinha. 2009. 'Existence of the *Standard system* in the multiple production case: A solution to the Manara problem', *Metroeconomica*, 60(3), 432-54.

Fratini, S.M. 2011. 'Review of *Theories of Value from Adam Smith to Piero Sraffa*', *Contributions to Political Economy*, 30(1): 102-105.

Garegnani, P. 1990a. 'Sraffa: Classical versus Marginalist Analysis', in *Essays on Piero Sraffa critical perspectives on the revival of classical theory*, K. Bharadwaj and B. Schefold (eds), Delhi: Oxford University Press.

Garegnani, P. 1990b. 'Reply', in *Essays on Piero Sraffa critical perspectives on the revival of classical theory*, K. Bharadwaj and B. Schefold (eds), Delhi: Oxford University Press.

Garegnani, P. 1990c. 'Comment', in *Essays on Piero Sraffa critical perspectives on the revival of classical theory*, K. Bharadwaj and B. Schefold (eds), Delhi: Oxford University Press.

Garegnani, Pierangelo. 2012. 'On Present state of capital controversy', *Cambridge Journal of Economics*, 36(6), 1417-1432.

Hicks, John. 1985. 'Sraffa and Ricardo: A Critical View', in *The Legacy of Ricardo*, G.A. Caravale (ed.), New York: Basil Blackwell.

Kurz, H.D. 2012. 'Don't treat too ill my Piero! Interpreting Sraffa's papers', *Cambridge Journal of Economics*, 36(6), 1535-1569.

Ricardo, David. 1951. *The Works and Correspondence of David Ricardo,* (ed.) Piero Sraffa, vol. I, Cambridge: Cambridge University Press.

Roncaglia, A. 1978. *Sraffa and the Theory of Prices*, Chichester: John Wiley & Sons.

Roncaglia, A. 2000. *Piero Sraffa His Life, thought and cultural heritage*, London: Routledge.

Samuelson P. A. 1951. "Abstract of a Theorem Concerning Substitutability in Open Leontief Models." In ed. TC Koopmans, *Activity Analysis of Production and Allocation*, New York: Wiley, 142-146.

Samuelson, P.A. 1990. 'Revisionist Findings on Sraffa', in *Essays on Piero Sraffa critical perspectives on the revival of classical theory*, K. Bharadwaj and B. Schefold (eds.), Delhi: Oxford University Press.

Sen, Amartya. 2003. 'Sraffa, Wittgenstein, and Gramsci', *Journal of Economic Literature*, 41, 1240-1255.

Sinha, Ajit. 2007. 'Sraffa and the Assumption of Constant Returns to Scale: A Critique of Samuelson and Etula', *Contributions to Political Economy*, vol. 26, 61-70.

Sinha, Ajit. 2010. *Theories of Value from Adam Smith to Piero Sraffa*, London, Routledge.

Sinha, Ajit. 2012. 'Listen to Sraffa's silences: A New Interpretation of Sraffa's *Production of Commodities*, *Cambridge Journal of Economics*, 36(6), 1323-1339.

Sinha, Ajit. 2013. 'On the notion of equilibrium or the centre of gravitation in economic theory' in *A Handbook of Post-Keynesian Economics vol. 1*, eds. G.C. Harcourt and P. Kreisler, New York, Oxford University Press, pp. 101-121 (Forthcoming).

Sinha, Ajit. and M-S. Dupertuis. 2009a. 'Sraffa's System: Equal Rate of Profits and the Notion of Centre of Gravitation' *Journal of Economic Behavior and Organization*, vol. 71, 495-501.

Sinha, Ajit. and M.-S. Dupertuis. 2009b. 'Sraffa and the Question of Equilibrium', *Cahiers d'économie politique*, N° 56, pp. 91-100.

Sraffa, P. (1960). *Production of Commodities by Means of Commodities*, Cambridge, Cambridge University Press.

Sraffa, P. Various Years. *Piero Sraffa Papers*. Wren Library, Trinity College, Cambridge.