

On the Long-period Method

A Comment on Ravagnani*

Heinz D. Kurz and Neri Salvadori

1. The paper by Ravagnani is divided into four sections. In the first section Ravagnani shows, quite convincingly, that in Sraffa's view the system of prices analysed in *Production of Commodities by Means of Commodity* applies to an economy which need not be stationary or quasi-stationary, that is, expanding at a rate of growth that is uniform across all industries. In the second section Ravagnani, starting from Hicks (1990), attributes to a number of interpreters of Sraffa's analysis, including ourselves (Kurz and Salvadori, 1995), the view that 'the theoretical positions defined in *Production of Commodities* can only be regarded as abstract representations of stationary economies' (p. 4). In the third section, which is the most relevant one, he argues that Sraffa's theoretical position

is in fact conceived as a guide to the average levels of the prices and quantities of the actual economy, taken over a time interval long enough to allow the competition of capitals to manifest its effects, and furthermore to allow, through the repetition of transactions, for a compensation of the accidental factors that may influence the actual prices. (p. 6)

He continues:

A consistent definition of a centre of gravitation is indeed compatible with some implicit tendency of the independent variables to change, provided this tendency can be considered sufficiently slow *relatively* to the forces that are supposed to engender the gravitation of the actual magnitudes towards their theoretical levels. Thus, in the context of classical theory, an appropriate definition of the normal position and normal prices does not require either the strict constancy of outputs or

* We should like to thank Christian Gehrke and Rodolfo Signorino for useful comments.

'constant returns to scale' in all industries. It only requires that the change in sectoral outputs inherent in the representative system of production be not so intense as to jeopardize, through an induced variation in the technical coefficients, the 'persistence' of the independent variables in the time interval to which the theoretical position refers. Here it would seem that Sraffa tacitly *assumed* this requirement of persistence to be fulfilled also in the presence of surpluses (deficits) of capital goods. (p. 7)

Finally, Ravagnani drives home his point by raising, in the fourth section, a number of difficulties concerning the conceptualization of the set of 'data' on which 'an intertemporal reformulation of the theory should be based.' (p. 9)

2. The argument developed in the third section shows clearly, we believe, that there is no unbridgeable gulf separating the views advocated by Ravagnani, on the one hand, and us, on the other. First, we share his interpretation that Sraffa did not take his price equations to apply only to the singularly special (and thus uninteresting) case of a stationary or a quasi-stationary economy (in conditions of free competition). In fact, what is explicitly referred to in Sraffa's analysis is a uniform rate of profits, not a uniform rate of growth equal to or larger than zero. Much of Ravagnani's reasoning revolves around the conditions to be met in order for the solutions of Sraffa's price equations to qualify as useful theoretical *approximations* of observable magnitudes, and we do not dispute his concern with specifying these conditions and the corresponding concept of 'theoretical approximation'.¹

Secondly, Ravagnani's argument at the same time makes it abundantly clear that the prices ascertained in terms of a 'classical' system of equations of production as developed by Sraffa apply *rigorously* or strictly only in cases in which either returns to scale are constant or the economy is stationary. In footnote 6 of his paper Ravagnani refers to the

¹ It is in this spirit that we wrote in the introduction to chapter 12, 'On limits to the long-period method', of our 1995 book: 'the long-period method employed throughout the preceding chapters of this book could be defended on the grounds that it is applicable, as a first approximation, to cases in which these changes [in the factors affecting relative prices and income distribution] are indeed sufficiently slow and gradual. Moreover, given the unsatisfactory state of economic theorizing in cases in which this premise is not met, the long-period method appears to be the only acceptable one available at present.' (Kurz and Salvadori, 1995, p. 341)

way in which Sraffa countered Harrod's interpretation of the price equations as applying to a stationary economy. Sraffa stressed that what matters is the solution of the price equations. He modified the first example of his book (see Sraffa, 1960, p. 3) in such a way that the system was no longer in a 'self-replacing state'. Comparing the two systems, the reader will easily see that the re-proportioning of the original system was carried out by Sraffa as if returns to scale with regard to both industries were constant. It is indeed on this assumption that the new system of production gives the same price solution as the original system.

Put in a nutshell, then, Ravagnani's argument amounts to the observation that the solution of Sraffa's price equations approximates theoretically the corresponding observable magnitudes in an economy which is changing slowly enough or, we might add, in which returns are not 'too variable'. We have no qualms with this view.

3. While the conditions just alluded to may be said to cover an important class of phenomena, it hardly needs to be stressed that they do not cover all cases the economist might want to study. Two examples must suffice: the first concerns exhaustible resources, the second obsolete machines (see also Kurz and Salvadori, 1995, ch. 12). It is not immediately clear how exhaustible resources could be subsumed under the long-period method. In this case the prices of the resources, and other prices as well, typically can be expected to change over time because in conditions of free competition the rate of profit obtained by conserving the resource tends to equal the rate of profit obtained in production (see Kurz and Salvadori, 2001). Interestingly, Sraffa was clear at an early stage of his work, which was to lead to his 1960 book, that the assumption of self-replacement of an economic system does not always mimick reality. In a note dated 25 March 1946 from his hitherto unpublished papers, he pointed out with regard to exhaustible resources:

But how are we going to replace these natural things? There are 3 cases:
a) they can be reproduced by labour (land properties, with manures etc.);
b) they can be substituted by labour (coal by hydroelectric plant: or by spending in research and discovery of new sources and new methods of economising)
c) they cannot be either reproduced nor substituted² – and in this case they cannot find a place in a theory of *continuous* production and consumption: they are *dynamical facts*, i.e. a stock that is being gradually exhausted and cannot be renewed, and must ultimately lead to destruction of the society. But this case does not satisfy our conditions

² This is Sraffa's formulation, which we left as it is.

of a society that just manages to keep continuously alive. (Sraffa's papers, D3/12/42: 33; second emphasis added)³

The note from his unpublished papers⁴ cited above indicates that to Sraffa exhaustible resources constitute 'dynamical facts' which cannot be studied rigorously in a framework in which prices do not change. Hence, a dynamic theory would be needed. Ravagnani puts forward a number of considerations which stress the difficulty, if not impossibility, of such an analysis. Interestingly, in another yet unpublished document Sraffa also reminded us of the intrinsic difficulties of elaborating such a theory. One of his notes reads:

It is 'a fatal mistake' of some economists that they believe that 'by introducing complicated dynamic assumptions, they get nearer to the true reality; in fact they get further removed for two reasons: a) that the system is much more statical than we believe, and its "short periods" are very long, b) that the assumptions being too complicated it becomes impossible for the mind to grasp and dominate them – and thus it fails to realise the absurdity of the conclusions. (Sraffa: D3/12/11 (33))

This warning has to be taken seriously. At the same time, to be aware that a journey one might want to embark on is full of dangers is not a sufficient reason to not to undertake it. We understood our own excursions into partly uncharted territory always as just probing steps and expressed warnings as to the explanatory power of the models elaborated (see, for example, Kurz and Salvadori, 1995, p. 359). However, looking back at our own efforts in this regard we feel that we learned something about the problem under consideration and also about the pitfalls the theorist ought to avoid.

³ The papers are kept at Trinity College Library, Cambridge. The references follow the catalogue prepared by Jonathan Smith, archivist. We are grateful to Pierangelo Garegnani, Sraffa's literary executor, for permission to quote from the hitherto unpublished material.

⁴ In his book Sraffa mentions exhaustible resources only in passing and on a par with land: 'Natural resources which are used in production, such as land and mineral deposits' (ibid., p. 74). He thus follows Ricardo's lead who, in chapter III of the *Principles*, subsumed the case of exhaustible resources under that of land, which is considered a renewable resource. We may thus conjecture that Sraffa intended to provide only a first approximation to the problem of exhaustible resources in terms of the theory of differential rent.

The second example we should like to mention are obsolete machines. Ravagnani also touches upon this example in his paper. Sraffa subsumes obsolete machines under the theory of differential rent:

Machines of an obsolete type which are still in use are similar to land in so far as they are employed as means of production, although not currently produced. The quasi-rent (if we may apply Marshall's term in a more restricted sense than he gave it) which is received for those fixed capital items which, having been in active use in the past, have now been superseded but are worth employing for what they can get, *is determined precisely in the same way as the rent of land*. (Sraffa, 1960, p. 78; emphasis added)⁵

Sraffa's proposition can immediately be utilized when obsolete machines are in short supply so that the prices are determined by the conditions of production of the processes in which obsolete machines are not used. Then the prices of obsolete machines turn out to be determined as residuals. However, if obsolete machine are not in short supply and therefore some non-obsolete machines will not be produced for a while, then the obsolete machines behave exactly as exhaustible resources do. In section 2 of chapter 12 of our book (Kurz and Salvadori, 1995) we clarified both points (also with the help of some exercises kindly provided to us by Giuseppe Freni). It is quite natural to conjecture that Sraffa considered the latter case as not very important.

Coming back to the principle relating quantities, prices and quasi-rents in Sraffa's book, it suffices to draw the reader's attention to § 88, in which the cases of 'extensive' and 'intensive' diminishing returns are dealt with. Sraffa concludes with regard to both: 'In this way the output may increase continuously, although the methods of production are changed spasmodically' (1960., p. 76). It is clear that here Sraffa is not referring to a system in motion or a dynamical analysis, but to a comparative static analysis of stationary economies with different output levels. However, we learn from his argument that when we analyse changes in outputs over time of a given economy, then these changes by themselves need not affect prices and income distribution as long as there are no changes in the methods of production. Yet we learn at the same time that even small or 'slow' changes in outputs may entail 'spasmodic' changes in the methods of production employed, and therefore in prices. In such conditions the 'approximation' to which Ravagnani wants to limit the analysis may be not be considered satisfactory any longer. At

⁵ As is well known, Knut Wicksell in this context spoke of 'rent goods'.

any rate, in the case discussed the prices at the time in which inputs are bought are different from the prices at the time in which outputs are sold.

4. We conclude that there are aspects of reality which are a part of the domain investigated by economists and which cannot fully satisfactorily be analysed using the procedure suggested by Ravagnani. Following him in this regard would involve neglecting problems which cannot sensibly be neglected. In the context of his criticism of Marshall's partial equilibrium analysis Sraffa (1925) stressed that some approximations are useful and appropriate, but some others are not:

Our argument is not concerned with the greater or lesser approximation of the assumption that the prices and quantities of the other commodities which use a factor in common with the commodity under consideration, remain unchanged. Our argument is that that assumption is absurd, and contradicts the preceding hypothesis, for the increase in production of a commodity leads to an increase in cost that has equal importance for that commodity and for the others of the group; so that *it cannot be taken into consideration for one and ignored for the others*. (Sraffa 1998, p. 361; emphasis added)

Applied to our present problem, we cannot follow Ravagnani when what we want to study is exactly returns that are not constant or a system of prices that need to change over time as a consequence of the assumptions made. In other words, we cannot at the same time neglect something and yet consider it as relevant. If that something cannot fully satisfactorily be dealt with in terms of some method or approach, then a somewhat different method or approach or a less partial analysis should at least be tried out to see how far we can get with it.⁶

References

Hicks, J. R. (1990) 'Ricardo and Sraffa'. Bharadwaj, K. and Schefold, B. (eds), *Essays on Piero Sraffa: Critical Perspectives on the Revival of Classical Theory*, London: Unwin Hyman., 1990, pp. 99-102.

⁶ This last point involves some subtle methodological questions (see Signorino, 2001).

- Kurz H. D., Salvadori N. (1995): *Theory of Production. A Long-Period Analysis*, Cambridge University Press, Cambridge.
- Kurz, H. D. and N. Salvadori (2001) 'Classical economics and the problem of exhaustible resources', *Metroeconomica*, **52**, forthcoming.
- Ravagnani, F. (2001) 'Produced quantities and returns in Sraffa's theory of normal prices: textual evidence and analytical issues', in this volume.
- Signorino, R. (2001). 'On the limits to the long period method. A note', *Review of Political Economy*, forthcoming.
- Sraffa, P. (1925). 'Sulle relazioni fra costo e quantità prodotta', *Annali di Economia*, **2**, pp. 277-328. English translation by John Eatwell and Alessandro Roncaglia in Pasinetti, L. L. (ed.), *Italian Economic Papers*, Bologna and Oxford: Il Mulino and Oxford University Press, 1998, pp. 323-63.
- Sraffa, P. (1960). *Production of Commodities by Means of Commodities. Prelude to a Critique of Economic Theory*, Cambridge: Cambridge University Press.