

Sraffa's prices of production understood in terms of Keynes's state of short-term expectation

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Preliminary discussion paper – June 2013

Abstract:

Joan Robinson wrote “Sraffa (1960) was not published until 1960. Sraffa had shown a draft to Keynes in 1928. Keynes evidently did not make much of it and Sraffa, in turn, never made much of the General Theory. It is the task of post-Keynesians to reconcile the two.” This paper attempts to rise to Joan Robinson's challenge, building on earlier work on the nature of the principle of effective demand. The central difficulty is to reconcile equilibrium with uncertainty and the paper suggests the solution lies within Keynes's distinction between short- and long-term expectation and furthermore between the long term and the technical long period. There is a definite case for seeking to recast the principle of effective demand without the Marshallian theory of value and the task is to achieve this without losing either an empirically useful concept of equilibrium or the concept of fundamental uncertainty.

Keywords: Sraffa, Keynes, equilibrium, uncertainty

JEL classifications: E11 E12

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In 1978, in the very first edition of the *Journal of Post Keynesian Economics*, Joan Robinson wrote “Sraffa (1960) was not published until 1960. Sraffa had shown a draft to Keynes in 1928. Keynes evidently did not make much of it and Sraffa, in turn, never made much of the General Theory. It is the task of post-Keynesians to reconcile the two.” This challenge was taken seriously for at least a decade, in particular through the Trieste Summer School which ran from 1981-1990 but ended in apparent failure. Several Post Keynesian authors, notably Sheila Dow (1988) and Stephen Dunn (2008), have argued that the two approaches are incompatible. By contrast, Gary Mongiovi (2003) and Marc Lavoie (2011) have argued that it is dangerous for Post Keynesian economics to adopt a small-tent view, à la Davidson, while Paul Davidson himself has argued forcibly, and to my mind convincingly, that a view should not be called Post Keynesian if it is incompatible with Keynes.

I am about to poke a stick into this currently dormant hornet’s nest by coming out in favour of Joan Robinson’s view. I build my bridge from the so-called ‘fundamental Keynesian’ side of the rift, where I have spent most of my scholarly time, and have still much to read about what used to be called neo-Ricardian theory and is now the surplus approach to value and distribution. This is very much a first poke at the nest, which I contribute to this workshop as a basis for discussion rather than a finished product, in the spirit that I believe Engelbert wishes to encourage. Here I am following Keynes’s, rather than Sraffa’s, approach to the airing of half-formed (I hope not half-baked) ideas.

So, why bother? First of all, what is the nature of the great divide? In a nutshell it corresponds to the difficulty of reconciling equilibrium with uncertainty. The methodological turn in Post Keynesian economics, from which I have greatly benefited, has emphasised the open and fluid character of the social material that we study and the inappropriateness of much mathematical theorising. This perspective is of great value for understanding the concept of fundamental uncertainty, which no Post Keynesian can dispense with. Nevertheless, when

fundamental uncertainty develops into radical indeterminacy, I think we have gone too far. I have recently published a paper on Keynes's state of short-term expectation (Hayes, 2013) in which I take apart Jan Kregel's seminal 1976 paper on expectation and equilibrium. I am waiting for the thunderbolt to strike me down. The paper also involves criticism of Vicky Chick's position, at least to the extent that it is based on Kregel, and she has been most gracious in debating the point with me at the Keynes Seminar (listen online, 9 March 2010).

In one sense that paper is focussed on a rather fine point of Keynesiology, as Michael Ambrosi would say, whether Keynes assumes in his exposition of the principle of effective demand that short-term expectations are fulfilled. The relevance of the paper to the present subject is that I argue that Keynes treats short-term and long-term expectations quite differently. I suggest that Keynes adopts an assumption of what he called judicious foresight and we would now call rational expectations in his analysis of the short term; the long term is, of course, a quite different matter. Thus for me the principle of effective demand is a theory of the *formation of short-term* expectations, meaning the prices expected for current production, as a set of instantaneous equilibrium prices determined by supply and demand. My key to this is the introduction of a division of entrepreneurs into the categories of employers and dealers, a division of function entirely observable in the real world. While I will never be able to prove beyond doubt that Keynes adopted this approach in *The General Theory*, I have cited considerable evidence from his discussion with Hawtrey that this division was part of the common-sense substrate of Cambridge thinking at the time.

Accordingly, when I say that short-term expectations are determined by supply and demand, I mean supply by employers of labour and demand by dealers in goods: demand by dealers, not final demand by consumers, nor usually demand by ultimate investors. The problem here is time, in this context *production* time. Services are a bit different, but goods and equipment cannot be created instantly on demand and production periods, from field or mine to retail

shelf, can be a year or more in length. Most goods are purchased from dealers, specialised investors who forecast onward demand for particular goods over a longer or shorter interval of time. And here is the chink through which I see the way to make a link to Sraffa.

Yet before we look through the chink, why do we need to? I would be the first to accept that *The General Theory* is a work of genius, not only in its vision, but in its theoretical precision, which has been seriously underestimated by friend and foe alike. I have also argued in my 2006 book that in creating a Marshallian macroeconomics, a theory of the equilibrium of industry as a whole, Keynes addressed and overcame Sraffa's 1926 criticism of the Marshallian theory of value, at the theoretical level of logical consistency. It is utterly false to claim that *The General Theory* is incoherent and devoid of appropriate microfoundations.

Yet *The General Theory* has its limits. In particular, Keynes admitted in his exchange with Dunlop, Tarshis and Kalecki, about cyclical movements in the real wage, that the empirical evidence calls into question the foundations of the Marshallian theory of value. A considerable strand of modern Post Keynesian thinking, notably by Fred Lee and Paul Downward, building on earlier work by Ken Coutts, Wynne Godley, and others, recognises that firms do not usually take auction prices or set them equal to marginal cost.

Keynes aspired towards an economic *science* in which theory can be confronted with evidence. He was therefore seriously concerned by the findings of Dunlop, Tarshis and Kalecki. The problem with *The General Theory* is not that it contains no theory of value, but that it contains a theory of value which does not correspond to the facts. This is a criticism, not only of Keynes, but of the entire edifice of marginalist economics within which he chose to cast *The General Theory*.

The task of replacing marginalist theory was, of course, the life ambition of Piero Sraffa.

Although he shares the fate of Keynes in being widely misunderstood, his endeavour was to

contribute to the production of a scientific theory of value which avoids the descent into metaphysics represented by Marshall's attempt to build a science based on the measurement of motives (Robinson and Eatwell, 1973; Kurz, 2012). There is some irony in the fact that in the hands of his successors, at least in the view of their critics, Sraffa's system has become associated with an ideal, timeless, equilibrium position without empirical counterpart or indeed any room for Post Keynesian concerns about expectations, long or short-term.

It was when I heard Man-Seop Park give a paper at the Keynes Seminar last year (you can also listen to him and Fabio Petri online), that I grasped the possibility of a synthesis between Sraffa and Keynes, through our shared recognition that long-period does not mean long-term and that the use of the term 'long-run' merely confuses matters. Long-period refers to logical time and long-term to historical time. Geoff Harcourt (1995) argues for following Joan Robinson in understanding 'long-period' as an adjective rather than a substantive. Garegnani (1979) insisted that the long-period or normal rate of profit is located *in the present*. In *The General Theory* the long-period position means the equilibrium employment that arises when the capital stock has fully adjusted to a given state of expectation so that in Sraffian or Kaleckian terms, the capital equipment is being utilised at the normal level. Man-Seop suggests that 'the Sraffa system of production prices *refers* to a fully-adjusted position, under the condition of free competition (just *referring*; that is, even if prices determined in the Sraffa system are established and the economy is in free competition, there is no need for the economy to be actually in a fully-adjusted position)' (Park, 2012).

The same question then arises as in the Marshallian system. Where do Sraffa's prices of production reside, if they are not observable as market prices? Are they any less metaphysical than Marshall's normal prices? I suggest Keynes's answer is clear: they exist in the minds of entrepreneurs. This does not make them metaphysical; the decisions about production and

employment that are made by firms on the strength of their expectations are perfectly concrete and observable. Expectation determines output and employment (GT Chapter 5).

The question for theory remains: what determines the expectations and how can these be objective, in the sense of the unique shared state of expectation to which Keynes constantly refers? This is the problem I have addressed in my previous work. In my rationalisation of *The General Theory*, these expectations are forward market prices struck each day between the employers and the dealers. The dealers have expectations (in the wider, non-technical, sense, of forecasts) of the likely level of future demand for their goods from consumers or investors, including other firms. Unlike in marginalist theory, consumer demand is a function not only of relative price and preferences, but also of less than full employment income, fashion and the whole host of influences Keynes calls the subjective influences on consumption. This allows for the full development of Post Keynesian consumer theory as proposed by Lavoie and indeed a valuable connection between theoretical economics and the practical study of marketing. And as we all know, investment demand cannot be reduced to rational expectations.

However manifold and complex the influences upon the formation of dealers' forecasts may be, the dealers must place orders with employers in order to obtain goods for stock. In *The General Theory* the supply conditions are Marshallian, with firms taking prices under perfect competition and offering quantities in line with marginal cost. The forward prices are the expectations, the expected prices which constitute the state of short-term expectation and correspond to a unique level and composition of effective demand. As Keynes notes, even if there are no formal forward markets, one can expect this set of prices to be discovered by trial and error, given the state of long-term expectation and the propensity to consume.

This framework can equally well accommodate the Sraffa price equations under conditions of free, rather than perfect, competition (see Appendix). Furthermore it is empirically reasonable and in line with Post Keynesian pricing theory to assume that employers set prices as a mark-up on normal costs, i.e. their expectations of average or long-period cost rather than marginal cost, while dealers set purchase quantities in line with their forecasts of final demand.

Generally dealers in turn set their own selling prices and take the resulting quantities from final customers, but note that these final sales quantities are known only at a future date.

Thus in dealers' orders we have the exogenous quantities of output that drive the rest of Sraffa's system. Given the technical conditions of production and the uniform rate of profit on capital towards which the various mark-ups tend under free competition, the equilibrium prices are determined. These prices are expectations in the same sense as before, a constellation of forward prices for delivery of goods to dealers at a variety of different dates corresponding to different periods of production. There is no reason why dealers' orders should not change from day to day, long before the previous day's orders are delivered. As orders change so will the equilibrium prices, unless there are constant returns to scale, which is often the case. Keynes's core insights are maintained but based on the Classical, rather than the neoclassical, theory of value and distribution.

Where does this leave long-term expectation and investment or accumulation? I find it interesting that Sraffa himself does not address accumulation. He makes no assumption about the division of the net product between consumption and investment. It is therefore possible to adopt his approach to the theory of value and distribution without necessarily forgoing an approach to investment and economic growth which recognises money and uncertainty.

We can substitute Sraffa's theory of value for Marshall's, within the framework of *The General Theory*, without doing violence to either Sraffa or Keynes. The key to this is the

recognition of the state of short-term expectation as a set of equilibrium prices, that may shift from day to day, but are nevertheless objective and reflect what we call the long-period, fully adjusted position. These prices of production may even be observable in the form of forward market or catalogue prices. Reconnecting equilibrium with reality, and Sraffa with Keynes, seem to me, big steps forward.

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Mathematical appendix

Keynes expresses the point of effective demand in mathematical terms (G.T. 25–9) as the solution to three equations:

$$D = f(N) = D_1(N) + D_2 = \chi(N) + D_2 \quad (1.1)$$

$$Z = Z(N) = \phi(N) \quad (1.2)$$

$$D = Z \quad (1.3)$$

where D_1 reflects the propensity to consume χ and is a function of aggregate employment, and D_2 reflects the inducement to invest and is independent of D_1 , and largely of N .

To make the relative prices and the supply and demand for the products of individual industries explicit, Keynes's system of equations can be expanded to:

$$D = D(\mathbf{n}, \bar{\mathbf{x}}) = (\mathbf{x} - \bar{\mathbf{x}})' \mathbf{p}^d \quad (2.1a)$$

$$\mathbf{x} = \chi(\mathbf{n}, \bar{\mathbf{x}}, \mathbf{p}^d) + \Theta(\mathbf{p}^d, \Omega, r) \quad (2.1b)$$

$$Z = Z(\mathbf{n}) = \mathbf{y}' \mathbf{p}^s \quad (2.2a)$$

$$(\mathbf{y}, \mathbf{p}^s) = \Phi(\mathbf{n}, \bar{\mathbf{x}}) \quad (2.2b)$$

$$D = Z \quad (2.3)$$

where column vectors are defined as follows:

- n** quantities of homogeneous labour employed today in each industry n_i
- x** quantities bid by dealers today x_i for delivery of a dated good i at the end of its production period, where goods include both consumption- and capital-goods produced by an industry. Each good may have a different production period, so that output is heterogeneous both by industry and by date of delivery.
- $\bar{\mathbf{x}}$ today's opening stock of producible capital-goods (Keynes abstracts from storage of consumption-goods by their definition). Capital-goods are held by rentiers and entrepreneurs of either type.

\mathbf{y} quantities offered by employers today y_i for delivery of a dated good i at the end of its production period. Negative elements of \mathbf{y} represent bids by employers for the output of other firms and for existing capital-goods (user cost).

\mathbf{p}^d forward bid prices corresponding to \mathbf{x} measured in wage-units.

\mathbf{p}^s forward offer prices corresponding to \mathbf{y} measured in wage-units.

Other variables and functions are as in *The General Theory*, except that χ and Φ are now vector functions, and D_2 is replaced by Θ , which allows current investment to vary with the price of capital-goods. Θ takes as parameters a given state of long-term expectation Ω and a given structure of interest rates r . The functions χ , Φ , Θ and the parameters $\bar{\mathbf{x}}$, Ω , r are exogenous, while all of \mathbf{n} , \mathbf{x} , \mathbf{y} , \mathbf{p}^d , \mathbf{p}^s are the endogenous variables whose equilibrium values are represented by the solution to the system.

Although no time subscripts are shown, this is an inter-temporal system, since all price and quantity variables are dated; yet it remains static in the usual sense, since the solution \mathbf{p}^* represents the spot and forward values at a point in time of a ‘temporary equilibrium’ (Arrow and Hahn, 1971, pp. 33–40, 347). Leaving aside certain complications about convergence to the long-period position, \mathbf{p}^* is Keynes’s state of short-term expectation.

Sraffa’s price equation system for basic commodities (i.e. those used as inputs in production of all commodities) without fixed capital can be represented as:

$$(1 + r)\mathbf{A}\mathbf{p} + \mathbf{w}\mathbf{l} = \mathbf{p} \quad (3.1)$$

subject to the normalisation in terms of a vector of commodities \mathbf{d}

$$\mathbf{d}\mathbf{p} = 1 \quad (3.2)$$

Equation 3.1 can be rewritten to take account of the holding of finished goods in stock by dealers as:

$$(1 + r)(\mathbf{A} + \mathbf{H})\mathbf{p} + \mathbf{w}\mathbf{l} = (\mathbf{I} + \mathbf{H})\mathbf{p} \quad (3.3)$$

where \mathbf{H} is a diagonal matrix composed of elements η_{ii} representing the average period of time for which each type of finished output is held in stock by dealers (i.e. half the period of production for that good), where time is measured in a standard unit such as Keynes’s day and r understood accordingly.

The solution \mathbf{p}^* corresponds to the state of short-term expectation.