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

M.G. Hayes

In the very first edition of the *Journal of Post Keynesian Economics* (Robinson 1978), 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.'

The great divide corresponds to the difficulty of reconciling equilibrium with uncertainty. The methodological turn in Post-Keynesian economics, to which Victoria Chick has contributed greatly, 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, with which no post-Keynesian can dispense. Nevertheless, Keynes's own approach to economic theory is in peril if fundamental uncertainty comes to be interpreted as radical indeterminacy.

This chapter proposes that Sraffa's prices of production can be understood in terms of Keynes's state of short-term expectation. Section I introduces Keynes's concept of the state of expectation and its intimate connection with the principle of effective demand and his approach to time periods and equilibrium analysis. Section II notes that Victoria Chick is one of the few to have recognised Keynes's use of expectation and discusses her contribution. Section III presents the principle of effective demand as a theory of the formation of the state of short-term expectation as an equilibrium set of expected prices. This paves the way for a transplant, to replace *The General Theory*'s Marshallian theory of value with Sraffa's. Section IV draws on unpublished work by Man-Seop Park to indicate how this might be done while respecting both equilibrium and uncertainty. Section V concludes with thoughts on the prospects for a new Post-Keynesian synthesis.

I

The title of Chapter 5 of *The General Theory* (Keynes 1936, hereafter *GT*) is 'Expectation as Determining Output and Employment'. From the perspective of most of the subsequent literature, this title is puzzling: 'expectation'– not demand, or expenditure; 'determining' – not influencing, or guiding; 'output and employment' – not income. Yet Keynes writes:

> The pure theory of what determines the *actual employment* of the available resources has seldom been examined in great detail . . . the actual level of output and employment depends on . . . the current decisions to produce . . . the behaviour of each individual firm in deciding its daily output will be determined by its *short-term expectations* . . . to-day's employment can be correctly described as being governed by to-day's expectations . . . every state of expectation has its definite corresponding level of long-period employment (*GT*, pp. 4, 47–50 and Keynes [1939a] 1973, p. xxxiii, emphasis in original).

Short-term expectations are expected prices, 'the price which a manufacturer can expect to get for his "finished" output at the time when he commits himself to starting the process which will produce it' (*GT*, p. 46). These depend 'in the case of additions to capital equipment and even of sales to distributors . . . on the long-term (or medium-term) expectations of other parties' (*GT*, p. 47). While it is often convenient to refer simply to changes in 'the state of expectation' as a whole, it is short-term expectations at any time that govern production, as opposed to investment, decisions.

Entrepreneurs set their 'daily' equilibrium output and employment in accordance with the prices they expect and their Marshallian supply functions. The day is Keynes's quantum unit of time, 'the shortest interval after which the firm is free to revise its decision as to how much employment to offer. It is, so to speak, the minimum effective unit of economic time' (*GT*, p. 47, fn. 1). It does no harm to think of this as a calendar day, especially in an era of zero-hour contracts. Marshall coined the term 'short period' to refer to the interval of time in which firms adjust their employment; for Keynes, this is a single day, even though the expected prices are for heterogeneous finished goods at the end of their differing production periods, many days ahead. Corresponding to the set of expected prices is an aggregate expected income, the effective demand, which is mapped onto a determinate level of employment through the employment function (*GT*, ch. 20). There is a definite, firmly mathematical, relation between the state of expectation and the level and composition of output and employment at any time (each day).

If the state of expectation persists, entrepreneurs will find it profitable to adjust the capital equipment (by new production or physical depreciation)

to match, so that the daily short-period equilibrium converges to its long-period position. Keynes uses the term 'long period' to refer to this adjustment of the capital equipment; his long period is short term, and his long term is not to be confused with the long period. The horizon of the long period is no more distant than the time it takes to produce the adjustment in the capital equipment, a matter of short-term expectation, while the long term relates to the economic life of capital equipment in service. In practice the convergence to a long-period position is likely to be overtaken by a change in the state of expectation, yet the daily short-period position remains observable.

So, indeed, expectation determines output and employment. The state of expectation at any time corresponds to a determinate and observable level and composition of aggregate employment, as a matter of short-period equilibrium. The state of expectation may change discontinuously from day to day, leading to shifts in the position of short-period equilibrium and simultaneous changes in effective demand and employment: Keynes's 'shifting equilibrium'. Yet employment remains in short-period equilibrium at all times, each day. Crucially, the state of expectation may change for many reasons, not limited to forecasting errors, but it really does not matter whether expectations are fulfilled: daily equilibrium is defined at a quantum point in time, for a given state of expectation, and tomorrow is another day.

II

The above rendering of Keynes's text may seem unfamiliar, even implausible. We have all been brought up on the 'income-expenditure' model, illustrated by the Keynesian Cross, based on the concept of equilibrium between expected and actual income. Although Keynes objected strongly to that 'Swedish', *ex ante*, *ex post*, interpretation of his work from the outset, his views were not published until 1973 (Keynes [1937] 1973, p. 181).

Victoria Chick's contribution can be seen as part of the critical assault on 'Keynesian' received wisdom, deconstructing that interpretation of *The General Theory* until it falls apart. On the one hand, she analyses in great detail the supply-side implications wholly neglected by the Keynesian Cross (Chick 1983; 1992). On the other, while agreeing that firms set employment in line with their short-term expectations of effective demand, she distinguishes between effective demand and the point of equilibrium corresponding to actual demand. She writes 'Effective demand is an unfortunate term, for it really refers to the output that will be supplied; in general

there is no assurance that it will also be demanded' (Chick 1983, p. 65). In her supply-side analysis, she argues that the short-term expectations of atomistic polypolistic firms are based on their expectations of industry supply and demand, so that there is no reason why these expectations should either coincide or be correct. She therefore accepts the likelihood of unemployment disequilibrium, and indeed goes further:

> Because underemployment equilibrium is an aggregate concept, it is impossible to believe that it would be met precisely: the probability of hitting the relevant point on aggregate demand exactly must be insignificantly different from zero. *Some* firms will always be surprised. Theorists more concerned with purity than with relevance, who cannot accept approximations, would therefore argue that some force for adjustment, however weak, must always be present, and since Keynes provides no dynamic learning process by which estimates of demand are adjusted when they are falsified, he fails as a theorist in their eyes (Chick 1983, p. 77).

She views this imprecision with equanimity and in her later methodological works has extended this to make a virtue of necessary compromise and formal vagueness in contrast with the sterility of what she calls 'Equilibrium Theory', theory that applies only in equilibrium, when the ocean is flat, as it were. Although she provides Keynes with a logical fig-leaf, by attributing to him a tacit assumption in *GT* Chapter 3 that expectations are fulfilled, this is sufficient neither for his claim to offer a theory of *actual* employment at any time nor for any equilibrium theory of value; indeed she rejects any rapprochement with the 'neo-Ricardians'. She points out that 'a concept of long-period equilibrium symmetrical with short-period equilibrium, which would entail long-period [*sic*] expectations of the profitability of investment being confronted with actual outcomes' has no place in *The General Theory*. Yet she suggests that Keynes's definition of long-period employment 'is the only place where Keynes entertains the possibility that long-period [*sic*] expectations are met'. She suggests this is 'a hypothetical situation designed not to mirror reality but to make a point' (Chick 1998, pp. 48–9).

It is quite correct to state that no useful concept of equilibrium can be based on the comparison of long-term expectations with outcomes. Keynes's reference to 'long-period employment' is either merely hypothetical, as Chick suggests, or, on the present reading, a matter of adjustment of the capital stock to a state of short-term expectation extending only as far as the horizon of the period of production (*GT*, p. 287). Despite its extraordinary tenacity as a misreading from the outset, the concept of equilibrium in terms of the fulfilment of expectations plays no role in *The General Theory*, either long-period or short-period.

III

How then is the state of short-term expectation determined? One answer is provided by Keynes himself: that in practice it can usually be based safely on realised results, that is, spot market prices (*GT*, pp. 50–51). This escape clause was seized upon by the 'Keynesians' with the consequence that short-term expectation and genuine effective demand (that is, based on a set of expected prices) dropped out of the picture. The 'New Classical' counter-reformation in turn rejected such 'adaptive' expectations in favour of 'rational' expectations, where rational meant conformity with a neo-Walrasian model. In the absence of a compelling alternative explanation of expectations, unemployment equilibrium once again became disequilibrium based on sticky wages or prices. The understanding of unemployment equilibrium as determined by the state of expectation and effective demand is of vital importance for avoiding this trap and the 'escape clause' is insufficient for this purpose.

I have argued at length elsewhere (Hayes 2006; 2007; 2013; Allain et al. 2013) that the principle of effective demand set out in *GT* Chapter 3 is itself a theory of the formation of the singular, shared, state of short-term expectation as a set of instantaneous equilibrium prices determined by supply and demand. The key to understanding this is to distinguish a division of entrepreneurs between the categories of employers and dealers, a division of function readily observable in the real world.[1] Although a large firm may combine both functions, they remain distinct in principle. Accordingly the statement, that short-term expectations are determined by supply and demand, means 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. Most goods are purchased from dealers, specialised investors who forecast onward demand for particular goods over a longer or shorter interval of time. It is through the dealers that a link to Sraffa can be forged.

The case for creating such a link is that *The General Theory* has its limits and is clearly not the final word. In particular, Keynes (1939b) 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 recognises that firms do not usually take

[1] In *The General Theory* Keynes refers to dealers as 'distributors', the horizon of whose medium-term expectations lies between those of the employers and long-term investors, presumably because they buy goods, not to hold them for their yield in production, but to sell on (*GT*, p. 47).

auction prices or set them equal to marginal cost (see Lavoie 2014). Keynes aspired towards an economic *science* in which theory can be confronted with evidence. He was therefore seriously concerned, if not wholly convinced, 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 so much of Keynes, as 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. By 'scientific' Sraffa meant to avoid 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. Still less does it appear to leave any room for Post-Keynesian concerns about expectations, either long- or short-term.

IV

The inspiration for this chapter is an unpublished paper by Man-Seop Park (Park 2012), which led me to grasp the possibility of a synthesis between Sraffa and Keynes, through the shared recognition that long-period does not mean long-term and that the use of the term 'long-run' merely confuses matters. Piero Garegnani insisted that the long-period or normal rate of profit is located in the present:

> This traditional long-period method . . . can perhaps be best made clear today by saying that it analyses those phenomena of Joan Robinson's 'short periods' which are not due to the incongruities between the existing plant, on the one hand, and the relative demand for commodities or the dominant methods of production on the other. . . . As Pareto would have described it, long-period analysis considers the events in these 'short periods' (more generally the economic phenomena as they are moment by moment) in their 'general form' – so as to explain them in their quality as 'general and average facts' (Garegnani 1979, p. 184).

In *The General Theory*, the long-period position means the equilibrium employment that arises when the stock of capital equipment has fully adjusted to a given state of expectation. In Sraffian or Kaleckian terms,

that means the capital equipment is being utilised at the normal level. Park (2012, emphasis in original) 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)'.

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 as expectations. 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.

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 addressed above. 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 medium-term expectations (of both price and quantity) of the likely level of future demand for their goods from consumers or investors, including other firms. 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 (see Lavoie 2014). Indeed it makes a valuable connection between theoretical economics and the practical study of marketing. Furthermore, as all Post-Keynesians 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 offering quantities in line with competitive prices and 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 ([1935a] 1973, pp. 602–3) 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 employer/dealer framework can equally well accommodate the Sraffa price equations under conditions of free competition. 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, 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 can be known only at a future date. Over time, employers adjust capacity in an effort to eliminate over- or under-utilization. The mark-up may be based on a uniform rate of profit or, going beyond Sraffa, upon a target rate of return for each industry or firm (Lavoie 2014, pp. 175–81).

Thus in dealers' orders we find the exogenous quantities of output that drive the rest of Sraffa's system. Given the technical conditions of production and target rates of return on capital, 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 may the equilibrium prices, unless there are constant returns to scale. Keynes's core insights are maintained but based on the Classical, rather than the neoclassical, theory of value and distribution.

Victoria Chick (as Joan Robinson before her) is rightly concerned that any equilibrium treatment of effective demand and value must not lose sight of uncertainty. Indeed it must be recognised how Keynes defines short-term expectations:

> An entrepreneur, who has to reach a practical decision as to his scale of production, does not, of course, entertain a single undoubting expectation of what the sale-proceeds of a given output will be, but several hypothetical expectations held with varying degrees of probability and definiteness. By his expectation of proceeds I mean, therefore, that expectation of proceeds which, if it were held with certainty, would lead to the same behaviour as does the bundle of vague and more various possibilities which actually makes up his state of expectation when he reaches his decision (*GT*, p. 24, fn. 3).

Keynes works with certainty-equivalents in order to build an equilibrium model in *GT* Chapter 3, which is necessarily an abstraction from empirical observation. In response to Hawtrey's 'My objection from the beginning has been to the expression of the expectations in the form of a *numerical aggregate*' (Hawtrey [1935] 1973, p. 610, emphasis in original), Keynes writes:

> I find it an aid to thought to introduce my numerical expression for demand in between the general state of expectation and the scale of employment which

> results from it. But I agree with you that it is in a sense an intermediate conception which drops out in the final analysis. The only thing that really matters is that the given state of expectation, whatever it is, does produce by its effect on the minds of entrepreneurs and dealers a determinate level of employment. But I should find it difficult to do without my schematism as a convenient method of quantifying the state of expectation (Keynes [1935b] 1973, p. 615).

The state of short-term expectation, construed in terms of Marshallian atomistic competition, is a set of short-period normal (as opposed to spot market) prices which cannot be directly observed except through a device such as the assumption of production to order and forward market prices. If firms set prices in line with long-period costs, these normal prices may be more readily observed. Yet, whether upon Marshall's or Sraffa's foundations, these normal prices are contingent upon a given state of expectation. They are quite different from the Walrasian solution set.

The uncertainty about spot market prices and quantities remains; there is no reason why dealers' expectations should necessarily be fulfilled. Changes in the state of expectation will lead to dealers making windfall profits or losses, which Keynes notes cannot affect production decisions (*GT*, p. 288). As Chick has noted in her appraisal of my earlier work, I have 'off-loaded this uncertainty onto a specialist group of wholesalers which [Hayes] has introduced. This is a feature which preserves the idea of a price which is "given" to producers and leaves them in continuous equilibrium, defined as maximising subject to a known constraint' (Chick 2016, p. 104, fn. 9). That is a fair summary, except that the medium-term expectations of distributors are already there on page 47 of Keynes's text.

V

We can substitute Sraffa's theory of value for Marshall's, within the wider 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 based on present estimates of the long-period position, as it would be if the capital stock were fully adjusted to the current state of expectation. These prices of production may well be observable in the form of forward market or catalogue prices, as distinct from spot market prices.

Where does this leave long-term expectation and investment or accumulation? Sraffa himself does not address the determinants of 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. That, of course, is the cue for Pasinetti (2007) and modern Kaleckian growth models. Indeed Park (2012) is an exploration in detail of the implications of the Keynesian autonomy of investment for the Sraffa price system.

Equilibrium analysis in economics can be rigorous (in the old sense of compliance with the facts, as well as in the modern sense of internal consistency) only in a given state of expectation, which for most purposes means only at a point in time. *The General Theory* contains at its core an equilibrium model that depends on independent variables, capable of discontinuous change, as well as exogenous parameters. The model is open-ended, driven ultimately by changing views about the future, embodied in the independent variables, which cannot be reduced to the parameters of the model or directly expressed numerically. Yet the model explains the level and composition of observable employment as a position of continuous equilibrium. Keynes strikes the right balance between what can, and what cannot, usefully be done with the tools of competitive equilibrium analysis.

This chapter is offered as a contribution to the unification of Post-Keynesian economics sought by Joan Robinson. Provided that the long period is understood as 'located in the present', Post-Keynesian analysis can accommodate not only an equilibrium theory of value based on Classical rather than marginalist foundations, but also non-marginalist theories of distribution, technical change and accumulation under uncertainty. The various fields of Post-Keynesian economics are not incompatible, viewed from this perspective. Reconnecting equilibrium with reality, and Sraffa with Keynes, represent big steps forward.

REFERENCES

Allain, O., J. Hartwig and M.G. Hayes (2013), 'Effective demand: securing the foundations – a symposium', *Review of Political Economy*, **25** (4), 650–78.

Chick, V. (1983), *Macroeconomics after Keynes: A Reconsideration of the* General Theory, Cambridge, MA: MIT Press.

Chick, V. (1992), 'The small firm under uncertainty: A puzzle of the *General Theory*', in B. Gerrard and J. Hillard (eds), *The Philosophy and Economics of J.M. Keynes*, Aldershot, UK and Brookfield, VT, USA: Edward Elgar Publishing, pp.149–64.

Chick, V. (1998), 'A struggle to escape: Equilibrium in the *General Theory*', in S. Sharma (ed.), *John Maynard Keynes: Keynesianism into the Twenty-first Century*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 40–50.

Chick, V. (2016), 'On microfoundations and Keynes' economics', *Review of Political Economy*, **28** (1), 99–112.

Garegnani, P. (1979), 'Notes on consumption, investment and effective demand: Reply to Joan Robinson', *Cambridge Journal of Economics*, **3** (2), 181–7.
Hawtrey, R.G. ([1935] 1973), 'Letter to J.M. Keynes', in *The General Theory and After, Part I: Preparation, Collected Writings*, vol. XIII, London: Macmillan and Cambridge: Cambridge University Press, pp. 604–12.
Hayes, M.G. (2006), *The Economics of Keynes: A New Guide to The General Theory*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.
Hayes, M.G. (2007), 'The point of effective demand', *Review of Political Economy*, **19** (1), 55–80.
Hayes, M.G. (2013), 'The state of short-term expectation', *Review of Political Economy*, **25** (2), 205–24.
Keynes, J.M. ([1935a] 1973), 'Letter to R.G. Hawtrey', reprinted in *The General Theory and After, Part I: Preparation, Collected Writings*, vol. XIII, London: Macmillan and Cambridge: Cambridge University Press, pp. 600–604.
Keynes, J.M. ([1935b] 1973), 'Letter to R.G. Hawtrey', reprinted in *The General Theory and After, Part I: Preparation, Collected Writings*, vol. XIII, London: Macmillan and Cambridge: Cambridge University Press, pp. 613–17.
Keynes, J.M. (1936), *The General Theory of Employment, Interest and Money*, London: Macmillan.
Keynes, J.M. ([1937] 1973), 'Ex post and ex ante', lecture notes reprinted in *The General Theory and After*, Part II: *Defence and Development, Collected Writings*, vol. XIV, London: Macmillan and Cambridge: Cambridge University Press, pp. 181–3.
Keynes, J.M. ([1939a] 1973), 'Preface to the French edition', *The General Theory of Employment, Interest and Money, Collected Writings*, vol. VII, London: Macmillan and Cambridge: Cambridge University Press, pp. xxxi–xxxv.
Keynes, J.M. ([1939b] 1973), 'Relative movements of real wages and output', *The Economic Journal*, **49** (193), 34–51, reprinted in *The General Theory of Employment, Interest and Money, Collected Writings*, vol. VII, London: Macmillan and Cambridge: Cambridge University Press, pp. 394–412.
Kurz, H.D. (2012), 'Don't treat too ill my Piero! Interpreting Sraffa's papers', *Cambridge Journal of Economics*, **36** (6), 1535–69.
Lavoie, M. (2014), *Post-Keynesian Economics: New Foundations*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.
Park, M.-S. (2012), 'Sraffa's "given" quantities of output and Keynes's principle of effective demand', paper presented at the Keynes Seminar, Robinson College, Cambridge, 13 March 2012, accessed 1 February 2017 at www.postkeynesian.net/keynes.html or www.robinson.cam.ac.uk/postkeynesian/keynes.html.
Pasinetti, L.L. (2007), *Keynes and the Cambridge Keynesians: A 'Revolution in Economics' to be Accomplished*, Cambridge: Cambridge University Press.
Robinson, J.V. (1978), 'Keynes and Ricardo', *Journal of Post Keynesian Economics*, **1** (1), 12–8.
Robinson, J.V. and J.L. Eatwell (1973), *An Introduction to Modern Economics*, London: McGraw-Hill.
Sraffa, P. (1960), *Production of Commodities by Means of Commodities*, Cambridge: Cambridge University Press.