The state of short-term expectation

Does Keynes implicitly assume that short-term expectations are fulfilled in Chapter 3 of *The General Theory* (Keynes, 1936, hereafter *GT*)? Why does this matter?

I shall conclude that what matters is nothing less than the coherence of Keynes's critique of 'Classical' competitive equilibrium theory and that the reading-in of this assumption is a serious mistake. What has been lost, in particular, is Keynes's avowed objective of integrating the theories of money and value, of redefining rather than abandoning the theory of value (*GT*, p. 293). The consequence has been the current dysfunctional state of understanding in which mainstream economists wrongly understand *The General Theory* as the economics of rigidity, while heterodox economists (including the original Cambridge Keynesians) have largely abandoned competitive equilibrium theory (Sardoni, 2008; Lang and Setterfield, 2007; Lawson, 2005; Backhouse, 2004).

The argument begins by considering how and why the consensus that Keynes makes this tacit assumption (as I shall refer to it from here on) about short-term expectations has emerged. The following sections apply two tests of the validity of reading in this assumption, in terms of consistency, first with the text and second with the logical framework of *The General Theory*. Then we consider briefly why the tacit assumption is unnecessary. The conclusion is that the attribution to Keynes of the tacit assumption is both unwarranted and unnecessary and that, astonishingly, Keynes and Lucas have something in common.

1. The current consensus

The consensus is undoubtedly that Keynes does assume in *GT* Chapter 3 that short-term expectations are fulfilled, although he does not state this in so many words. For example, Chick (1983, p. 64) refers to "the assumption, maintained throughout most of the first Book of the *General Theory* (Chapter 5 is the exception), that firms' estimates of planned aggregate demand are essentially correct" and in the footnote to this sentence: "Kregel (1976) emphasises this point. It is a pity Keynes did not make more of it." Hoover (1997, pp. 223–4) writes "Keynes regards the formation of short-term expectations as a second-order concern, and assumes, for purposes of exposition, that short-term expectations are always fulfilled." Most recently, Allain (2009, p. 3) writes "When writing Chapter 3 of the *General Theory*, he implicitly assumes that entrepreneurs' short-term expectations are fulfilled."

The origins of the claim that Keynes made this tacit assumption appear to lie in Keynes's 1937 lecture notes (CW XIV) and in the celebrated article by Jan Kregel (1976), which most authors cite in this connection. In the lecture notes, Keynes states

the theory of effective demand is substantially the same if we assume that short-period expectations are always fulfilled … if I were writing the book again I should begin by setting forth my theory on the assumption that short-period expectations were always fulfilled; and then have a subsequent chapter showing what difference it makes when short-period expectations are disappointed. (CW XIV, p. 181)

Kregel (1976) christens a model in which short-term expectations are always fulfilled 'the model of static equilibrium' and distinguishes this from the 'stationary model … that Keynes relies on, for the first 18 chapters of *The General Theory*' and from the 'model of

shifting equilibrium' (we consider these models in detail later). The immediate point to note is that neither Keynes nor Kregel suggest that Keynes actually made the assumption in *The General Theory* itself, tacitly or otherwise, that short-term expectations are always fulfilled. Kregel is careful to distinguish the static from the stationary model and sees the static model only in the 1937 lecture notes, not in *The General Theory* itself.

Why have so many writers felt it necessary to read this tacit assumption into *GT* Chapter 3? The nub of the matter is Keynes's definition of effective demand:

… the amount of employment, both in each individual firm and industry and in the aggregate, depends on the amount of the proceeds which the entrepreneurs expect to receive from the corresponding output. For entrepreneurs will endeavour to fix the amount of employment at the level which they expect to maximise the excess of the proceeds over the factor cost.

Let Z be the aggregate supply price of the output from employing N men, the relationship between Z and N being written $Z = \varphi(N)$, which can be called the *aggregate supply function*. Similarly, let D be the proceeds which entrepreneurs expect to receive from the employment of N men, the relationship between D and N being written $D = f(N)$, which can be called the *aggregate demand function*.

Now if for a given value of N the expected proceeds are greater than the aggregate supply price, i.e. if D is greater than Z, there will be an incentive to entrepreneurs to increase employment beyond N and, if necessary, to raise costs by competing with one another for the factors of production, up to the value of N for which Z has become equal to D. Thus the volume of employment is given by the point of intersection between the aggregate demand function and the aggregate supply function; for it is at this point that the entrepreneurs' expectation of profits will be maximised. The value of D at the point of the aggregate demand function, where it is intersected by the aggregate supply function, will be called *the effective demand*. (*GT*, pp. 24–5)

The question turns on the meaning of Keynes's description of adjustment to equilibrium and how this relates to expectation. There can be no doubt that Keynes is here concerned with expectation, expected proceeds and expected profits. Furthermore, aggregate demand is defined in terms of the expectations of entrepreneurs, who are treated as a group, rather than in terms of the expenditure of consumers and investors. Furthermore, since production takes time (as Keynes emphasises on *GT*, p. 46), how do expectations relate to realised results and what exactly motivates entrepreneurs to change their employment decisions?

The consensus holds that the process of adjustment must be a dynamic process of convergence over time, motivated by the disappointment of expectations, so that equilibrium is reached and defined by the fulfilment of expectations. In grappling with the fact that Keynes specifies aggregate demand in terms of the expectations of entrepreneurs, writers have postulated the need for two aggregate demand functions, one in terms of entrepreneurial expectations, the other in terms of expenditure. There is some tension within the literature over which of the two demand functions defines the point of effective demand. The absence of the expenditure function in Keynes's text is taken as evidence that Keynes conflates the two, which is only possible if entrepreneurial expectations are fulfilled: therefore, it seems, this must be his tacit assumption.[1]

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[1] References to the extensive literature can be found in King (1994) and Hayes (2007), to which can now be added Hartwig (2007) and Allain (2009).

Again a point to note at once is that the idea of convergence of expectations to equilibrium is associated with the 'Swedish' approach, which predated Keynes and was expounded by Ohlin in the November 1936 Marshall Lectures (subsequently published as Ohlin, 1937A and 1937B), and which the main object of Keynes's 1937 lectures, titled 'Ex Post, Ex Ante', was to repudiate:

For other economists, I find, lay the whole emphasis, and find the whole explanation in the differences between effective demand and income; and they are so convinced that this is the right course that they do not notice that in my treatment this is *not* so. (*CW* XIV, p. 181)

Unfortunately these lecture notes were not published until 1973, which is one reason why Kregel (1976) is of particular importance as the beginning of a discussion about effective demand that appeared to have concluded with Amadeo (1989), until its recent re-emergence. Since Kregel (1976) has been widely recognised as the seminal work on the treatment of short-term expectation in *The General Theory*, the next section takes this article as its starting point for considering the consistency of the claim that Keynes makes a tacit assumption with the text of *The General Theory* itself.

2. The test of consistency with the text of *The General Theory*

Kregel (1976)

The original purpose of Kregel (1976) was to defend the use of steady-state models by the Cambridge post-Keynesian School, notably Joan Robinson, against the claim that such models are inconsistent with the methodology of Keynes. Kregel argues that the core of *The General Theory* is the principle of effective demand, which can be expressed with static tools, with the disappointment of expectations and consequent dynamics taking second place. His overall proposition is that Keynes's concept of equilibrium as contingent on a state of expectation is radically different from the Walrasian perfect foresight model so that unemployment equilibrium (so defined) is possible even when expectations are fulfilled. There can be no disagreement with these primary propositions.

Kregel's article is now cited less for its principal purpose than for its definition of three models, of static, stationary and shifting equilibrium. Keynes himself referred to a 'division between the theory of stationary equilibrium and the theory of shifting equilibrium—meaning by the latter the theory of a system in which changing views about the future are capable of influencing the present situation.' (*GT*, p. 293). In the 'static' model, the state of expectation is given and expectations are always realised; the system moves instantly to the point of effective demand. This model reflects the proposition in Keynes's 1937 lecture notes quoted above and corresponds to the 'tacit assumption'. The 'stationary' model allows for individual expectations to be disappointed without affecting the underlying given state of 'general' expectations. Disappointed entrepreneurs then revise their expectations until, by trial and error, they hit on the point of effective demand. Finally in the 'shifting' model, the state of 'general' expectation can change, both independently and as a result of individual disappointments. This model describes an economy 'chasing an ever changing equilibrium – it need not catch it' (Kregel, 1976, p. 217).

Although Kregel's analytical key to Keynes's method is elegant and has undoubtedly been persuasive, his reading of the text is open to serious objections. These can be

summarised as the usage of the terms 'static' and 'stationary'; the meaning of 'period' and term'; the introduction of a distinction between individual and general expectations; the difference between a change in expectation and disappointment of expectation; the correspondence of production with short-term, not long-term expectation; and the implication that employment will normally be in disequilibrium.

Kregel's choice of the term 'static equilibrium' to denote a state in which expectations are fulfilled is unfortunate: static equilibrium refers only to a point in time without necessarily implying anything about future outcomes. It is true that Walrasian general equilibrium theory reduces the future to the present, so that 'static' becomes associated with 'timeless', yet *The General Theory* is also (for the most part) static in its method of equilibrium analysis and anything but timeless. Indeed the term 'stationary' would be a better description of a state in which short-term expectations are always fulfilled, but Kregel uses this term for a different purpose, namely to denote a given *and constant* state of expectation. Again this usage is unsatisfactory, for the only place where Keynes assumes a constant state of expectation is where he considers the convergence of employment to a long-period equilibrium position (*GT*, pp. 47-50): an exercise in disequilibrium dynamics, hardly an example of stationarity.

Kregel draws 'a distinction between particular individual (short-period) expectations and the effect of the state of "general" (long-period) expectations' (Kregel, 1976, p. 210). This is not a distinction made by Keynes, who writes:

These expectations, upon which business decisions depend, fall into two groups … The first type is concerned with 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 … The second type is concerned with what the entrepreneur can hope to earn in the shape of future returns if he purchases (or, perhaps, manufactures) "finished" output as an addition to his capital equipment. We may call the former short-term expectation and the latter long-term expectation. (*GT*, pp. 46-47).

Kregel elides the concepts of period and term. In fairness, Keynes himself sometimes used the terms interchangeably, including in the 1937 lecture notes. Yet in *The General Theory* itself, he was remarkably consistent in reserving the adjectival '-period' to refer to the type of equilibrium (short-period, involving the adjustment of employment of existing resources, and long-period, involving the adjustment of the aggregate capital equipment through either production or physical depreciation, following Marshall) and the word 'term' to refer to the two different types of expectation (short-term, long-term). The distinction is important. For example, in the section about convergence to long-period employment just referred to above, Keynes refers to a constant 'existing state of expectation'. Since Keynes defines employment as based on short-term expectation (itself partly a function of long-term expectation, so that we can follow him in referring simply to the state of expectation), in this section Keynes describes the long-period adjustment, including changes in the aggregate capital equipment as well as in employment, to a new state of (short-term) expectation. So long-period employment relates to the short, and not the long, term and to use the words interchangeably in this context creates confusion. Long-period adjustment might take a matter of months or a year or so, sufficient time to produce new capital-goods or scrap old equipment, while the long term, over which new equipment yields its fruit, could be many years. Consider the

difference between the interval from a decision to erect a new building until its completion and the useful life of the building itself.

Furthermore, the distinction drawn by Kregel between 'particular individual' and 'general' expectations does not exist for Keynes. Keynes consistently refers to 'the' state of expectation, encompassing both short- and long-term expectation and both individual and general, with short-term expectation being in part a function of long-term expectation (*GT*, pp. 47-51). Kregel's 'static model' certainly generates such a shared state of expectation and this may be part of the attraction of imposing this model as a reading of *GT* Chapter 3. However, the 'stationary model' which Kregel attributes to *The General Theory* itself does not contain a singular, shared state of expectation but has room for the disappointment of individual expectations while general expectations remain constant. This point is considered further in the next section in relation to the logical problems to which it gives rise.

The target of Kregel's paper is, quite rightly, the claim that Keynes's primary contribution is an emphasis on the recognition that expectations may be disappointed, where this claim is to be understood in the Swedish terms of *ex ante* and *ex post*. It is therefore ironic that, even though he shows (through the device of the 'static model') that disappointment of expectations has nothing to do with the principle of effective demand, Kregel still places a great deal of emphasis on the disappointment of short-term expectation, whether in the 'shifting model' where disappointment of individual expectations leads to change in the general expectation, or in the 'stationary model', where disappointment does not so lead.

By contrast, Keynes concerns himself mainly with change in expectations rather than with any disappointment consequent upon such change. The passage on convergence referred to above (*GT*, pp. 47–50) begins with the statement 'Now, in general, a *change* in expectations (whether short-term or long-term) will only produce its full effect on employment over a considerable period'. The dynamic process of long-period adjustment of the capital equipment described here and elsewhere (*GT*, pp. 122–4, 287–8) takes place in a *given* state of expectation, after a change in expectation (by definition, unanticipated) has already taken place, with its consequent windfall gains and losses. Disappointment of expectations 'cannot affect the *actions* of entrepreneurs, but merely directs a *de facto* windfall of wealth into the laps of the lucky ones' (*GT*, p. 288).

Kregel states that Keynes made the assumption of 'constant long-period expectations' (in the static and stationary models), thereby separating out long-term expectation from the state of expectation as a whole and allowing short-term expectation to be disappointed. Kregel continues by stating that

the relative importance of long- and short-period expectations are thus given varying weight in the *General Theory* and at certain points in the book Keynes does not make it clear what he is assuming about each … this rather confusing mix, in which particular expectations could be disappointed, but could not affect long-term expectations which by assumption were held constant, Keynes found to be unsatisfactory … (Kregel, 1976, p. 212)

The confusion here (apart from the interchange of period and term once again) is with the possibility that realised results disappoint short-term expectations yet the state of *short-term* expectation (not 'long-period expectations') remains unchanged. Keynes writes

'The *actually realised* results of the production and sale of output will only be relevant to employment in so far as they cause a modification of subsequent [short-term] expectations' (*GT*, p. 47), and clearly this leaves open the possibility that such expectations remain unchanged.

Kregel gives the example of a producer of electrical power as follows:

Short-period expectation determines how many kilowatts he expects to produce and how much labour he wants to hire to produce them, given capacity. Long-period expectations determine how much capacity he should have at various future dates and determine overall investment decisions and plans. If in one quarter demand for electricity falls by 5%, is this likely to cause a revision of long-period expectations of required future capacity? (Kregel, 1976, p. 224)

The answer is clearly negative, but it is the wrong question. The question should be, if on any given day, demand for electricity falls 5% below expectation, should our electrical entrepreneur reduce the next day's employment? The answer is, probably not: one day's shortfall is unlikely to affect the state of expectation relevant to employment, i.e. the state of short-term expectation.

Finally, in Kregel's stationary and shifting equilibrium models, employment is more likely than not to be in disequilibrium at any time. In these models, the principle of effective demand does not determine employment at any time (unless we make the tacit assumption) but only the equilibrium position towards which employment would tend if individual expectations were stable enough to converge. By contrast, Keynes claims to offer a theory of actual employment at any time (*GT*, pp. xxxiii, 4, 245–7) based on the equilibrium of supply and demand (*GT*, pp. xxii–iii, xxxiv–v, 3, 27–30), such that 'today's employment can be correctly described as governed by today's expectations' (*GT*, p. 50). Yet he himself refers to this as a 'theory of shifting equilibrium' (*GT*, p. 293).

In summary, although Kregel himself does not claim that Keynes made the tacit assumption, Kregel's hermeneutic key has been pivotal in encouraging later authors, including Victoria Chick, to reach that conclusion. It has therefore been necessary to dissect that framework in order to establish where it parts company from Keynes's text.

Chick (1983)

Chick, both in her major text on *The General Theory* (1983) and a subsequent article (1992), offers perhaps the most sophisticated development of the received idea that the equilibrium level of employment in *The General Theory* is discovered, in principle, by the fulfilment of expectations. She argues that, for the purposes of exposition, Keynes must have made the tacit assumption (Chick, 1983, pp. 64–5, 71) and explicitly relates this to Kregel's static model (ibid., p. 67). She objects that

Keynes provides no theory of the process by which firms come to evaluate aggregate demand, the need for such a theory is obviated by Keynes's assumption … that firms' estimates are correct. There is also no detailed discussion of the dynamics of adjustment of those estimates when they prove to be incorrect. (ibid., p. 76)

As justification for stating that 'Keynes adopted, in the early chapters, the *assumption that firms' forecasts of aggregate demand were broadly correct*' she quotes in a footnote (ibid., p. 71, footnote 15) the following sentence from Keynes:

[It] will often be safe to omit express reference to short-term expectation, in view of the fact that in practice the process of revision of short-term expectation is a gradual and continuous one, carried on largely in the light of realised results; so that expected and realised results run into and overlap one another in their influence. (*GT*, p. 50)

However, Keynes goes on to say:

For, although output and employment are determined by the producer's short-term expectations and not by past results, the most recent results usually play a predominant part in determining what these expectations are. … Accordingly it is sensible for producers to base their expectations on the assumption that the most recently realised results will continue, except in so far as there are definite reasons for expecting a change. (*GT*, pp. 50–51)

The causation here runs from realised result to expectation, not the other way. Expectations conform to realised results, not realised results to expectations. There is nothing here to require that expectations based on realised results will in fact be fulfilled; there is indeed a hint here of the notion of conventional expectation (*GT*, pp. 152–3). It is true that there is no detailed discussion of the dynamics of expectations formation, but why is such a discussion necessary? It is not necessary if employment at any time is determined by effective demand, i.e. by the state of expectation itself.

Chick indeed recognises that, for Keynes, employment at any time is determined by the point of effective demand but, contrary to Kregel, distinguishes this from the equilibrium point corresponding to actual demand (ibid., pp. 77-78). She distinguishes determinacy from equilibrium and requires the tacit assumption only to the extent that we insist on reading *GT* Chapter 3 as an exercise in equilibrium analysis. In her words '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' (ibid., p. 65). 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. (ibid., p. 77)

Chick 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'. This leaves any theorist, who is concerned with both purity and relevance, uncomfortable with the idea that Keynes was unable to construct tight theory, especially as that is exactly what he claims to have done (*GT*, pp. 38–40). Yet Chick's conclusion follows relentlessly from the premises of the received understanding of *The General Theory*, which does not accept Keynes's claim to offer a theory of employment at any time nor consider how the principle of effective demand might itself be a theory of the formation of expectations as equilibrium values. At this point, we move from exegesis into hermeneutics and the next section.

3. The test of logical consistency

In the previous section, I have compared statements of two distinguished authors with the text of *The General Theory* and found specific contradiction. The next question is whether their conceptual framework, upon which is based the claim of the tacit assumption as the solution for making sense of Keynes, is in fact consonant with that of Keynes and this, of course, is a matter of interpretation and judgement. My strategy is therefore to demonstrate logical inconsistency in the received framework, both internally and with the different framework of *The General Theory*. The key questions on which the argument turns are the existence, uniqueness and stability of the 'state of general expectation' implicit in the received conceptual framework.

Existence

As noted above, Keynes constantly refers to 'the' state of expectation of entrepreneurs. What can this mean, since expectations are necessarily formed in the minds of individual entrepreneurs and why should they agree? Kregel's solution is to make the distinction between individual and general expectation (not made by Keynes), where individual expectation can be disappointed while general expectation persists. In whose mind, then, does the general expectation exist and secondly, how and why should individuals fall into line?

In Keynes's augmented-Marshallian framework, a 'short-term expectation' corresponds[2] to an expected price, the price 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 [the entrepreneur's] state of expectation when he reaches his decision' (*GT*, p. 24, n3). A 'state of expectation' can in turn then be associated with a set of short-term expectations or expected prices for each Marshallian industry for producible goods.

This understanding of short-term expectation differs markedly from that of Kregel and Chick, who envisage firms estimating demand curves, whether at the industry or aggregate level (Kregel, 1976, p. 225; Chick, 1992, p. 150). Indeed this point connects directly with another disputed question, the assumptions about market structure in *The General Theory*.[3] Here we need concentrate, for present purposes, only on the distinction made by Chick between 'perfect competition' and 'polypoly', her term for competition between many small firms under uncertainty.

Chick rejects the price-taking of the received notion of 'perfect competition' because in her view it imposes the assumption of perfect foresight; she insists that under uncertainty all firms, even small ones, inevitably set prices. She asks: 'How can firms take prices from markets which lie in the future? The short answer, of course, is that they cannot' (Chick, 1992, p. 153). Her solution is to postulate that firms set prices, initially by making hypotheses about demand, constructing hypothetical demand curves as opposed

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[2] Keynes writes 'expectations as to the cost of output on various possible scales and expectations as to the sale-proceeds of this output' (*GT*, p. 47). Given the conditions of supply, there is a direct relation between sale-proceeds and price on the assumption of perfect competition.

[3] Kregel states that Keynes did not adopt 'any particular theory of competition' (1987, p. 490) and Chick 'that, once the question of uncertainty is addressed, the *General Theory* is compatible with any or all market structures' (1992, p. 150). Partly this is due to a confusion in the literature over the meaning of Keynes's degree of competition, which I have addressed elsewhere (Hayes, 2008).

to either expected or actual demand curves. A set of hypothetical demand curves traces out the firm's supply curve and the firm then chooses the particular point on the supply curve which corresponds to its expectation of demand. In the case of polypoly, firms ignore strategic interdependence and base their expectation of demand (i.e. demand price) on their estimate of the price that clears expected supply and demand in the market as a whole. The analysis can be generalised to the cases of monopoly and oligopoly.

The problem with (or virtue of, depending on one's perspective) this construction is simply that there is no reason why firms should arrive at the same expectations. It is therefore quite possible that individual expectations are disappointed (as both Kregel and Chick insist) but it leaves us without the singular, shared state of expectation referred to by Keynes. Any given level of employment may be associated with a myriad of different 'states of expectation' represented by all the different permutations of individual expectations that would lead firms, in aggregate, to offer that particular level of employment. Any hope of determinacy lies, then, only in the convergence of individual expectations to a general expectation which is correct in the sense that it corresponds uniquely to any given level of employment.

Uniqueness

Kregel defines his 'general (long-period) expectations' to correspond to Keynes's 'long-period employment' (*GT*, p. 48) as the end-point of a process of convergence of individual expectations (Kregel, 1976, pp. 215, 223–4). Thus 'the state of general expectations' represents a set of expectations, which may not in fact exist in the minds of any entrepreneur, but is nevertheless an equilibrium position towards which individual expectations will tend by a process of trial and error. Chick (1983, p. 78) contains a diagram (Fig. 1) which describes this convergence of expected demand (D^e) to the actual demand (D) and of employment to its equilibrium value B (as distinct, in her view, from the moving point of effective demand, depicted by A).
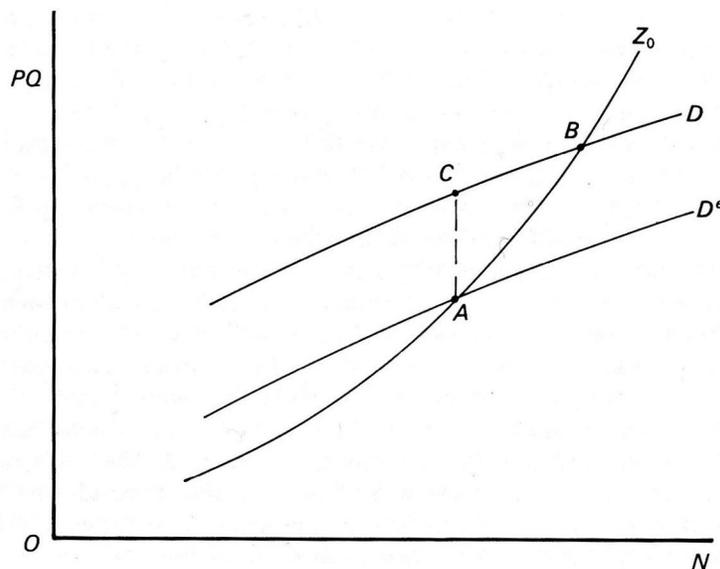

Fig. 1 *Effective demand vs. equilibrium in Chick (1983)*

Kregel notes that convergence requires the assumption of independence between individual and general expectations: 'a state of affairs that led to much confusion and Keynes's eventual rejection of this model in favour of the static model for the exposition of the principle of effective demand' (ibid., p. 215, footnote 1). In Chick's diagram, the centre of attraction is provided by the equilibrium of actual demand with supply conditions. So it seems that, *contra* Keynes, expectation does not really determine output and employment, except in the individual daily disequilibrium which Kregel and Chick regard as the normal state of affairs: the 'state of general expectations' is itself determined by the expenditure decisions of consumers and investors. The most one can claim for entrepreneurial expectation as an independent causal force is that the expenditure decisions of investors are determined by the state of long-term expectation. It follows that the state of short-term expectation is of no fundamental consequence and indeed, it is argued, Keynes himself accepts this view because after *GT* Chapter 5 aggregate demand is defined in terms of expenditure rather than entrepreneurial expectations. The Surplus school have gone one step further and downgraded the importance even of long-term expectation (Milgate, 1982).

Yet there is a fatal ambiguity in this interpretation of Keynes's long-period employment as corresponding to an equilibrium state of general expectation reached by a process of trial and error. Any such process of discovery must take place over time. If the end-point is to be defined by the equilibrium between expenditure demand and the conditions of supply, the aggregate supply curve must not shift (Kregel, 1976, p. 215). At the same time we are assuming that investment is taking place, creating new capital-goods and therefore continuously changing the conditions of supply.[4] Thus a further indeterminacy is introduced: if by chance individual expectations converge quickly, the state of general expectation will take one set of values; if convergence is more prolonged, the state of general expectation will take another. In fact there is a multitude of possible equilibrium positions which are not independent of the time it takes to find them. Thus we find ourselves immediately, even in what Kregel defines as the model of stationary equilibrium, with the problem which Kregel defines by the model of shifting equilibrium, in which the behavioural functions are constantly shifting and equilibrium need never be reached. We began with general expectation as something unknown to any individual and now it appears that there can be an indefinite number of states of general expectation, since each depends on how long it takes for individuals to discover it.

Stability

It could be argued that it is not important that the state of general expectation is unique, what matters for the coherence of the principle of effective demand is that individual expectations can be expected to converge upon the state of general expectation, whatever it may be at any given time. Yet even this claim cannot be taken for granted. Chick's diagram (Fig. 1) assumes as self-evident the existence of a well-behaved function mapping excess demand onto changes in expected prices, which Hicks (1939, p.255), Arrow & Hahn (1971) and Vercelli (1991) have shown not to be the case in general when

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[4] This turns around the very criticism made, in my view erroneously, by both Pigou and Kalecki in their 1936 reviews of *The General Theory*.

several markets are involved. What appears obvious at the microeconomic level of a single market does not hold at the macroeconomic level.

In this area we can, for once, profit by taking a leaf out of the Walrasian literature, much of which has been concerned with questions of stability and expectations formation. In Hicks's seminal analysis, the stability of the equilibrium depends on the elasticity of expectations and the simplest adaptive assumption, that expectations are revised in line with realised results (unit elasticity), does not lead to convergence and easily topples over into instability. Arrow & Hahn (1971, pp. 263–369) show that stability theorems even for models of pure exchange depend on an assumption of continuity which is easily over-turned by the possibility of bankruptcy. Vercelli (1991, pp. 100-104) identifies 5 *ad hoc* assumptions necessary to avoid both dynamic and/or structural instability and indeterminacy. Evans and Honkapohja (2001) present a theory of adaptive learning, in which agents are assumed to behave like econometricians, estimating the parameters of the system by running regressions. While their main concern is to establish that under certain conditions agents discover the one or more rational expectations equilibria defined by various standard Classical dynamic general equilibrium models, Evans and Honkapohja make it clear that these conditions are not guaranteed. From a Keynesian perspective, in which the equilibrium position is liable to discontinuous shifts due to changes in the state of long-term expectation or the propensity to consume, the ability of agents to form reliable and convergent estimates by the econometric analysis of past data is, at the very least, open to question.

The important distinction must be made between convergence from a position of simple disequilibrium *per se* and convergence from a position of short-period equilibrium to a position of long-period equilibrium. Both Kregel and the Walrasians are concerned with the former, extremely difficult, case. The latter is the Marshallian case which is analytically far more tractable and for which stability is much more assured (Hayes, 2006, pp. 99–100; 2007, pp. 75–7). It is this Marshallian case to which Keynes's long-period employment refers: the convergence of employment to a long-period position (i.e. in Keynes's sense, a state where the capital equipment has adjusted to the state of expectation) if a *given* state of expectation persists. In Keynes's case, it is not individual expectations but the capital stock which is adjusting along the dynamic traverse.

It therefore appears that Kregel's state of general expectation neither exists in the minds of individual entrepreneurs nor can the dynamics of expectations formation be relied upon to bring individual expectations into line with the general state. There could not be a greater contrast with Keynes's singular 'state of expectation'. If we follow Kregel, we can no longer claim with Keynes to explain '*why*, in any given circumstances, employment is what it is' (*CW* XIV pp. 121–122) – it is all a matter of individual expectations which, as we have shown, have no firm anchor. In the final analysis, the whole thing falls apart and Keynes's shifting equilibrium becomes Kregel's shifting disequilibrium, in which we chase shadows through the twilight.

4. Doing without the tacit assumption

The task of this paper is mainly critical but would not be complete without an indication as to how it is possible to understand Keynes without making the tacit assumption. Space precludes a full exposition, which can be found elsewhere (Hayes 2006, 2007). The

essential insight is a recognition that the analytical core of *The General Theory* is a static equilibrium construction which links together a set of independent variables and parameters with a set of dependent variables in a determinate fashion at a single point in time. The independent variables are the propensity to consume, the states of long-term expectation and of liquidity preference, and the quantity of money expressed in wage-units. The parameters are those of the Marshallian system. The dependent variables include the set of expected prices of currently producible goods which constitute the state of short-term expectation and have a functional relation with effective demand and the level of employment. Thus short-term expectations are equilibrium prices determined by supply and demand; the principle of effective demand is itself a theory of the formation of short-term expectations. This insight depends in turn on a recognition of Keynes's radical reshaping of Marshall's treatment of time and equilibrium periods.

The point of effective demand is a short-period equilibrium position, meaning that entrepreneurs adjust employment each day to maximise expected profit. Keynes's short period is linked to his day, which is his quantum unit of time (*GT*, p. 47), so that aggregate demand and supply are in static equilibrium at all times (every day); the equilibrium process of finding the point of effective demand described on *GT* page 25 takes place on a single day. The equilibrium prices of the output resulting from today's employment are determined each day as the set of prices which clear the supply offers by employers and the demand bids by dealers in the forward markets for delivery of each type of good on the different future days corresponding to the end of their production periods. Each day, employment moves directly to the equilibrium position corresponding to the forward prices, although there may be a difference between the short-period and long-period positions because of the production time required to adjust the capital equipment. Thus if the effective demand for any given day corresponds to a set or vector of forward prices for each industry, there is also a matrix of such vectors, with one column for each day of the period of production (*GT*, p. 287), similar to Hicks's production plan (1939, p. 193). This 'expectations matrix' $\mathbf{\Pi}$ may be regarded as the numerical expression of the state of short-term expectation.

$\mathbf{\Pi}$ determines the effective demand and employment for each day of the period of production in a given state of expectation. The column representing today's forward price vector determines today's employment, and $\mathbf{\Pi}$ as a whole plots the convergence path of employment over the period of production to its long-period position, so that both the short-period and long-period equilibrium positions are fully determined by a given state of expectation. Even if $\mathbf{\Pi}$ changes from day to day, today's equilibrium employment is always on a convergence path towards a long-period position.

At no point does this construction involve the fulfilment of expectations. Disappointment of short-term expectations may, or may not, shift the expectations matrix but these disappointments are likely to be trivial compared to the effect of sudden shifts in the states of long-term expectation or of liquidity preference. The formation of expectations is always a matter for the present moment and it is not necessary to tangle with insoluble problems of expectations formation under dynamic conditions of unpredictable discontinuity.

We have already noted that, after *GT* Chapter 5, Keynes treats aggregate demand in terms of expenditure rather than expectation, yet he is not inconsistent. The coupling between

expectations and expenditure, between forward-looking effective demand and current income, cannot be made formally exact; by the time the final output resulting from today's employment is delivered, the state of expectation will almost certainly have changed. However, the effective demand represented by the expected present value of the final output corresponding to today's employment is equal to today's factor income plus expected future profits. Factor income arises today, when the factors are employed. The difference between effective demand and income arises over the period of production in the form of the unexpected windfall gains and losses of entrepreneurs on work in progress relative to their original expectations. It is reasonable to assume that today's consumption is mainly a function of today's factor income and that consumption out of profits by entrepreneurs (especially corporations and their shareholders) is likely to be insensitive to minor differences between expected and realised income. Thus the realised prices of finished goods consumed today may well be the best guide, in the absence of definite reason to the contrary, to the prices that can be expected, when the goods whose production begins today are finished and come on to the market. It is in this sense that trial and error may substitute for judicious foresight. Employment remains determined exclusively by expectation.

5. Conclusion

The claim that Keynes makes a tacit assumption that short-term expectations are fulfilled is unwarranted and unnecessary, owing more to Stockholm than to Keynes. The interpretative framework that requires it has undermined Keynes's claim to offer a determinate theory of employment at any time and helped to lead post-Keynesian economists into abandoning competitive equilibrium theory altogether.

There is an unlikely consensus between Joan Robinson and Robert Lucas that if we are to do equilibrium theory, we must assume that we are always in equilibrium. New Classical theory clings to full employment as the appropriate conception of equilibrium, where Keynes offers, in the principle of effective demand, the concept relevant to the monetary production economy. Where New Classical theory invokes rational expectations in order to assure full-employment equilibrium, Keynes limits rational expectations ('judicious foresight') to the state of short-term expectation, leaving the state of long-term expectation as an independent variable. Nevertheless there is a point of contact here between Keynes and Lucas, which ought to permit the start of a debate. No debate is possible if Keynes's treatment of time is thought to remove any possibility of determinacy from the theory of employment under competition.

To read *The General Theory* as a theory of employment as in equilibrium at any time does not vindicate 'Equilibrium Theory' as the sole or even primary tool of economics. On the contrary, competitive equilibrium analysis must be confined to its legitimate domain, the present moment. Today's short-term expectations and employment may be equilibrium values, but they can shift discontinuously between today and tomorrow and no mathematics can bridge the abyss. We need different tools to explain phenomena which involve progress through time, such as economic growth, fluctuations and crises. Keynes's distinction between the theory of stationary equilibrium and the theory of shifting equilibrium remains the necessary starting point.

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