

Expectations and Equilibrium: Implications for Keynes, the Neo-Ricardian Keynesians, and the Post Keynesians

Author(s): Amitava Krishna Dutt

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Expectations and equilibrium: implications for Keynes, the neo-Ricardian Keynesians, and the Post Keynesians

A key idea in Keynes' *General Theory* (1936) is that expectations involving an uncertain future affect aggregate demand decisions. Where the resulting aggregate demand function intersects the aggregate supply function (that is, effective demand), an employment equilibrium is determined that may involve involuntary unemployment.

Even among followers of Keynes there is substantial controversy as to how to treat uncertainty, expectations, and the concept of equilibrium in macroeconomic theory.¹ Some Post Keynesians have emphasized the role of uncertainty.² Other Post Keynesians have been highly sceptical of using the equilibrium method. Neo-Ricardian Keynesians, on the other hand, have restricted their attention to long-period positions which may be treated as equilibrium positions, and have refused to incorporate the role of such ephemeral and transitory factors (in their judgment) as uncertainty and expectations into their formal analysis. Finally, mainstream or neoclassical Keynesians, and especially the "New Keynesians," have tended to obliterate uncertainty (as opposed to risk) from their equilibrium analysis. If they introduce expectations at all, they do so in response to, and following the method of, the rational expectations school which denies the existence of involuntary unemployment.

The purpose of this paper is to examine and clarify some issues

The author is Professor of Economics at the University of Notre Dame, Notre Dame, Indiana. This paper was originally written while the author was a visiting scholar at the Faculty of Economics and Politics, University of Cambridge, and at Wolfson College, Cambridge. The author is grateful to Edward Amadeo for earlier discussions, and to Geoff Harcourt, Avi Cohen, an anonymous referee of this journal, and especially, Paul Davidson for their valuable comments and suggestions on earlier versions.

¹ See Dutt and Amadeo (1990) for a fuller discussion.

² See Davidson (1991) for a recent discussion of the role of uncertainty in Post Keynesian economics.

concerning Keynes' treatment of uncertainty and expectations and his use of the notion of equilibrium in *The General Theory*, and to comment on the implications of these issues for Post Keynesian and neo-Ricardian Keynesian views on equilibrium. To do so, it develops a simple model that formalizes Kregel's (1976) ideas on Keynes' modeling method.³

This paper proceeds as follows: section 1 briefly discusses Keynes' method of handling the behavior of the firm in an uncertain environment, that is, by distinguishing between short- and long-period expectations. Section 2 develops a simple framework, drawing on aspects of chapters 3 and 5 of *The General Theory* and some of Keynes' later notes. Section 3 formally distinguishes between what Kregel calls Keynes' static, stationary, and shifting equilibrium models, and examines some implications of these different models. Section 4 comments on Keynes' rationale for favoring some of the models, and discusses the implications of the analysis for Post Keynesian and neo-Ricardian Keynesian views on equilibrium.

1. Uncertainty and expectations

As is well known to readers of *The General Theory*, Keynes emphasized that economic decisions are made in a situation of pervasive uncertainty, in which the future is simply unknown. This is especially relevant, in Keynes' view, in the analysis of the behavior of the firms and asset holders, but for the purposes of this paper, we confine our attention to the behavior of firms.

Keynes assumes that in making decisions in an uncertain environment firms form expectations regarding the future. He distinguishes between production plans concerning how much is to be produced in the near future, and investment plans concerning the installation of capital goods to be used for production in the more distant future. Relevant for the former are short-period expectations, and for the latter, long-period expectations.

The first question that arises is: expectations of what? To fix our ideas, we assume that the economy has a purely competitive goods market,⁴ and that cost conditions are known to the firm. In purely competitive

³ See also Davidson (1978, pp. 375–376).

⁴ Keynes actually assumes that the degree of competition is "given" (Keynes, 1936, p. 245), which suggests that his analysis is compatible with any notion of competition. However, since he agrees with the classical postulate that the real wage is equal to the marginal product of labor (which is true only if pure competition is assumed), the pure competition model was the one he paid most attention to in the book—not because he thought that it was an appropriate characterization of reality, but presumably because he wanted to show how unemployment equilibrium could exist using a

markets, firms expect to sell all they want to sell at the going market price, so that, unlike what has been suggested by some,⁵ they cannot form expectations of sales volumes. The uncertainty arises regarding what the market price will be, so that the firm can form expectations only regarding this market price. Thus, short-period expectation refers to the price the firm expects to get when it sells what it produces now, and long-period expectation refers to some scalarization of a vector of market prices that the firm expects to receive in the more distant future. If cost conditions are not known, then long-period expectations would also refer to future wages and technology.

The second question that arises is why Keynes distinguishes between the two types of expectations. Keynes wanted to treat the two differently to show the existence of unemployment equilibrium. But this does not explain why Keynes was *justified* in treating the two differently. There are two possible explanations for this. First, the two expectations refer to two different time horizons—one for the near future and one for the more distant future—and it is plausible that firms form (and revise) these expectations in different ways. Second, and related to this, is the fact that Keynes was concerned in *The General Theory* with the short period in which the stock of capital goods is given, and in which *in equilibrium* short-period expectations have to be realized.⁶ This is so because, if these expectations were not realized, firms would revise their expecta-

framework that was as close as possible to that of those whom he called “classical” economists, and that unemployment had nothing to do with market imperfections. The word “pure competition” is used here, as opposed to “perfect competition,” following Chamberlin (1933), because “[i]t is a much simpler and less inclusive concept than ‘perfect’ competition, for the latter may be interpreted to involve perfection in many other respects than in the absence of monopoly. It may imply, for instance, an absence of friction in the sense of an ideal fluidity or mobility of factors such that adjustments to changing conditions which actually involve time are accomplished instantaneously in theory. It may imply perfect knowledge of the future and the consequent absence of uncertainty” (p. 6). In confining attention to the short period, Keynes was abstracting from the mobility of capital goods, and he was certainly emphasizing the presence of uncertainty regarding the future. It needs to be emphasized that our whole analysis could be conducted introducing some form of imperfect competition.

⁵ See Torr (1988), for a recent discussion. Torr argues that firms under pure competition will not be able sell all that they produce in recessions. This is clearly inconsistent with the assumption of pure competition: whether in recessions or in booms, firms must *expect* to sell all that they produce. In recessions they will expect the market price to be low. With market imperfections, of course, firms will form expectations regarding the quantity of sales.

⁶ There may be some dispute over whether Keynes in fact assumes that short-period

tions, so that the economy could not be in equilibrium if firms could change these expectations. No such restriction needed to be placed on long-period expectations as the question of their realization does not arise, simply because the period to which they refer is in the future, beyond the short period in which Keynes was interested.

2. A simple framework

The framework we use here—perhaps the simplest one we could use for our purposes—draws on some of Keynes' ideas in chapters 3 and 5 of *The General Theory*, but deviates from Keynes in certain respects.⁷ It is concerned with Keynes' analysis of the goods and labor markets only, and leaves asset market issues in the background. Following Keynes, we assume that the economy is a closed one, and that there is no government activity.

Firms—and here we sweep aggregation problems under the rug by using the concept of the representative firm—have a given utilization function that relates the flow of output of a single good to the flow of labor services employed and the stock of capital goods. Technology and

expectations were realized in equilibrium. Keynes (1936, p. 25; 1973, pp. 179–180) writes that, in equilibrium, effective demand is determined by the intersection of the aggregate demand function which shows the proceeds that entrepreneurs expect to receive, and the aggregate supply function. For Keynes, the “expected results are not on a par with the realised results,” and “the difference [between actual and expected income], if any, is due to a mistake in the short-period expectation and the importance of the difference lies in the fact that this difference will be one of the factors in determining subsequent effective demand” (Keynes, 1973, pp. 179–181). There is no doubt that such points of effective demand could imply unemployment. However, in his summary of his theory, Keynes (1936, pp. 28–30; see also 1973, p. 180) seems to emphasize that the propensity to consume and the volume of investment determine the level of demand, which may be taken to imply that actual and expected proceeds are equal in equilibrium. Moreover, in later notes, partly as a reaction to those, such as Robertson, Hawtrey, and Ohlin, who in Keynes' opinion linked the existence of unemployment to differences between aggregate demand and income, Keynes (1973, p. 181) writes that the difference between actual and expected proceeds is “of secondary importance, emphasis on it obscuring the real argument. For the theory of effective demand is substantially the same if we assume that short-period expectations are always fulfilled.” In what follows we will consider the cases of both unfulfilled and fulfilled short-period expectations by distinguishing between market- and short-period equilibria.

⁷ The framework is intended only to be an illustrative one, and the general conclusions of the paper could be developed from alternative frameworks. Two goods—a consumption and an investment good—could be introduced easily to replace the one-sector framework used here. Imperfect competition, non-neoclassical production conditions, and a different specification of demand could be introduced in the manner discussed below.

the stock of capital goods are given in the short period, and intermediate goods are ignored for simplicity, so that:

$$(1) \quad Y = F(N),$$

where Y is the flow of output and N the flow of labor services employed, and F the utilization function with $F' > 0$, and $F'' < 0$. The economy is purely competitive, and firms decide on how much to produce by maximizing expected profits, given their short-period expectation. This implies:

$$(2) \quad W/e = F'(N),$$

where W is the money wage and e the price the firm expects to receive when it sells its output, or short-period expectation. They make investment plans (in real terms) depending on their long-period expectation, E ,⁸ so that:

$$(3) \quad I = I'(E),$$

where $I' > 0$.

We depart from Keynes by assuming that there are two types of households—workers and capitalists.⁹ Workers receive a given money wage W ,¹⁰ and consume a fraction α of their income WN , while capitalist consumption is fixed in real terms and given by C_o .¹¹

⁸ Since we ignore asset markets, the interest rate does not enter into the investment function as an argument. Its entry need not imply that the economy would be led to a position of full employment by the so-called Keynes effect. See Dutt (1986–87) for a discussion.

⁹ Keynes simply assumes that consumption is a function of income, and except for a brief mention, does not distinguish between wage and profit income. This assumption is made only to allow us to determine an equilibrium price in the market period by making demand respond to the price level. While this assumption is not the only avenue for achieving this end (the real balance effect would also suffice), it is a convenient one. It should also be pointed out that our analysis does not fundamentally depend on the determinateness of the market-period equilibrium.

¹⁰ This accords with Keynes' method. Keynes shows how, given the money wage, one can determine the short-period equilibrium with unemployment. Of course, he later shows (Keynes, 1936, ch. 19) that changes in the money wage do not necessarily take the economy to full employment, so that unemployment is not (necessarily) caused by money–wage rigidity.

¹¹ An alternative framework, which makes the model closer to Kalecki than to Keynes, could introduce non-neoclassical production conditions and imperfect competition. A fixed coefficients production function could be used, implying a horizontal marginal cost curve. The firm could form short-term expectations regarding the elasticity of demand (or the degree of monopoly) and produce to maximize profits given that elasticity. In a manner analogous to that discussed below for the model of pure competition, if the actual price deviates from the price implied by the perceived elasticity, the firm could revise its perceived elasticity.

We now consider two notions of equilibrium for this model.¹² First, in the market period,¹³ firms take e and E as given, and in equilibrium the price, P , clears the goods market. Given e , N is determined in equation (2), and P is determined from the market-clearing condition,

$$(4) \quad Y = \alpha(W/P)N + C_o + I,$$

which implies:

$$(5) \quad P = \alpha WN(e)/[F(N(e)) - C_o - I(E)],$$

where $N(e)$ is the solution of equation (2), given W . $N(e)$ has the property that $N'(e) > 0$, or that the profit-maximizing level of employment will be higher the higher the expected price. Note that there is no reason why P , the realized price, should be equal to e , its expectation; if they are not equal, beyond the market period, firms would want to revise their e , which we took as given in the market period.¹⁴

Second, in short-period equilibrium, not only is equation (5) satisfied (so that the goods market clears), but also short-period expectations should be realized,¹⁵ so that:

$$(6) \quad e = P.$$

Otherwise, firms would want to revise e , and the economy would not be

¹² This follows Dutt (1987).

¹³ Keynes (1973, p. 179) also calls it the production period.

¹⁴ This follows Keynes' ideas on the effects of disappointed short-period expectations, as quoted in note 6 above, and shows that Keynes was very much a Marshallian (see Davidson, 1978). Expected price e , based on which firms make production plans, is Marshall's short-period flow-supply price: it is the price of the expected future spot (or market period) price of current production. If the realized price P , which is Marshall's actual market period price realized when the product is sold in the market, differs from the short-period flow-supply price, then according to Marshall firms change their output and employment decisions. Paul Davidson has also drawn my attention to the relation between this analysis and Keynes' use of the concepts of forward (corresponding to the short-period flow-supply price) and spot (corresponding to the market price) price in chapter 17 of *The General Theory*, which was derived from Sraffa's earlier discussion of Hayek.

¹⁵ In note 6 we mentioned that there may be some dispute on whether, at least in *The General Theory*, Keynes precisely used this notion of equilibrium. But in later work he clearly discusses it when he writes: "Entrepreneurs have to forecast demand. They do not, as a rule, make wildly wrong forecasts of the equilibrium position. But, as the matter is very complex, they do not get it just right; and they endeavour to approximate to the true position by a method of trial and error. Contracting where they find that they are overshooting their market, expanding where the opposite occurs. It corresponds exactly to the higgling of the market by means of which buyers and sellers endeavour to discover the true position of supply and demand" (Keynes, 1973, p. 182).

in equilibrium. Using this notion of equilibrium, Keynes showed that the economy could be in a state of unemployment in which all those willing to work would not be employed.¹⁶

It may be noted that in this discussion of short-period equilibrium we have not made any assumption regarding long-period expectations, E , or specifically regarding the relationship between e and E . In the following section we specify these issues to obtain three alternative models.

3. Static, stationary, and shifting equilibrium models

Kregel (1976) has carefully distinguished between alternative models used by Keynes, involving alternative assumptions regarding short- and long-period expectations and their interaction. One model, to be found in Keynes' 1937 lectures (Keynes, 1973) but not in *The General Theory*, Kregel calls the static model, in which E is taken to be constant, and e is realized (and e and E are independent). In a second model, called the stationary model, E is constant and e may be disappointed and hence changing, so that E and e are independent. The third model, called the shifting equilibrium model, assumes that E is shifting, that e may be disappointed, and that e and E are interdependent. The second and third models are found in *The General Theory*.

3.1. The static model

The static model thus assumes, in terms of our framework, that equation (6) is satisfied. Thus, the only notion of equilibrium with which it is consistent is the short-period equilibrium one, in which both equations (5) and (6) are satisfied. This equilibrium can be shown in our model, assuming a given E as shown in figure 1. The $P(e)$ curve of the figure shows the market-period equilibrium (or goods market clearing) level of P for each level of e , and can be derived from equation (5). Differentiating equations (5) with respect to e , we get:

¹⁶ Note that in equilibrium, in general, profits will not be zero. This is because, despite the assumption of pure competition, we are confining our attention to the market and short period when the zero-profit condition is not used. If we did assume the zero-profit condition, demand would become independent of the price and there could generally be no market-period equilibrium price, and if, further, workers consumed all their income (so that $\alpha = 1$), there would be no short-period equilibrium level of employment. Without the zero-profit condition, even with $\alpha = 1$ (provided C_0 and I are not too large), there should be no difficulty in obtaining the equilibria.

$$dP/de = \alpha WN'(e)[F(N) - C_o - I(E) - N.F'(N)]/[F(N) - C_o - I(E)]^2.$$

In market-period equilibrium, where equation (5) is satisfied, $F(N) - C_o - I = \alpha(W/P)N$, so that we can rewrite this as:

$$(7) \quad dP/de = \alpha WN'(e)N \{ \alpha[(W/P) - F'(N)] - (1 - \alpha)F'(N) \} / [F(N) - C_o - I(E)]^2.$$

When $e = P$, equation (2) shows that $W/P = F'(N)$, so that:

$$dP/de = -\alpha(1 - \alpha)WN'(e)NF'(N)/[F(N) - C_o - I]^2,$$

so that at the 45-degree line (where $e = P$), the $P(e)$ curve is negatively sloped. For $P > e$ (above the 45-degree line), $W/P < W/e = F'(N)$ so that as $N'(e) > 0$, $dP/de < 0$. Thus, $P(e)$ is negatively sloped in this region. Analogously, when $P < e$ (below the 45-degree line), since $W/P > F'(N)$, $dP/de < 0$ is possible (because of the term with $(1 - \alpha)$), but with increases in e and hence N , as F' becomes small, $dP/de > 0$, so that $P(e)$ becomes positively sloped. Equilibrium is attained in this static model when $P = e$ and the goods market clears, or when the $P(e)$ and $e = P$ (45-degree) lines intersect, at A . The model assumes that the economy is always at A in short-period equilibrium, since $e = P$.¹⁷

3.2. The stationary model

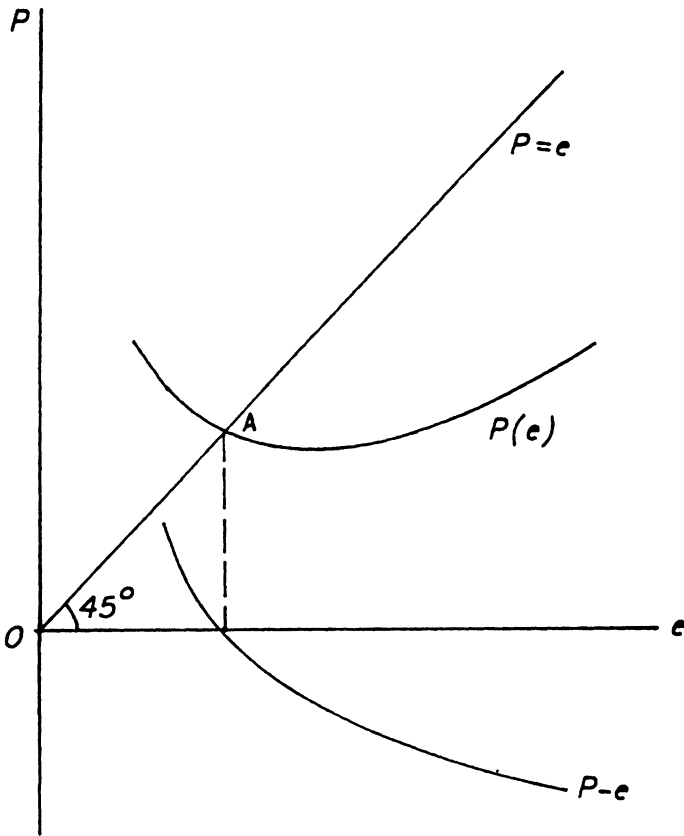
The stationary model also assumes that E is fixed, but allows e to differ from P . If we assume that the economy is always in market period equilibrium, so that equation (5) is satisfied, it will always be on $P(e)$, but since e is not necessarily equal to P , the economy is not always at point A . Given a level of e , if P is different from e , one would expect that firms would revise their e . A simple adaptive expectations process could be assumed, with:

$$(8) \quad de/dt = \beta[P - e],$$

where $\beta > 0$. As shown in figure 1, this adjustment process would imply that the economy would adjust, in a stable manner, to the short-period equilibrium at A . Note that the equilibrium is the same for both static

¹⁷ Strictly speaking, one could imagine for this model states of disequilibria when the market does not clear, so that equation (5) is not satisfied, even imposing $e = P$. This means the model only requires us to be on the 45-degree line, but not on the $P(e)$ line. Points other than A , of course, would show excess demand (points below A) or excess supply (points above A).

Figure 1



and stationary equilibrium models, so that the path of adjustment does not affect the final equilibrium.¹⁸

3.3. The shifting equilibrium model

The shifting model assumes that short-period expectations are not necessarily realized, so that e can differ from P , but it also allows changes in e to cause changes in E . Thus, disappointed short-period expectations make firms change e , and this also leads them to alter E . A simple formalization of this is to assume that:

¹⁸ If we also wish to analyze the implications of nonmarket clearing, we could imagine positions off the $P(e)$ line, with excess supply leading to price declines above the curve, and excess demand leading to price increases below the curve. Adjustment in this case would imply changes in both e and P , and equilibrium would again be stable and independent of the path to it.

$$(9) \quad E = E(e),$$

where $E' > 0$.¹⁹ To analyze the nature and stability of the short-period equilibrium for this model, we can proceed by using a diagram similar to that in figure 1. For short-period equilibrium, short-period expectations must be realized, so that $P = e$, which implies that equilibrium must again be on the 45-degree line. Equilibrium also requires that the goods market must clear, so that equation (5) must also be satisfied, so that equilibrium must be on the $P(e)$ curve. The $P(e)$ curve will now be different from the one derived before, since it must take into account the dependence of E on e , given by equation (9). To find the shape of the $P(e)$ curve, we substitute equation (9) into equation (5) and differentiate with respect to e to obtain:

$$(10) \quad \frac{dP}{de} = \alpha WN \{ N' [\alpha (W/P) - F'] - (1 - \alpha) F' + I' E' \} / [F(N) - C_o - I]^2.$$

When $P = e$, we again have $W/P = F'(N)$, which implies, since $E' > 0$, and $I' > 0$, that $dP/de > 0$ is possible when the $P(e)$ line intersects the 45-degree line. This implies that it is possible for the $P = e$ and $P(e)$ curves to appear as they do in figure 2a, but it is also possible that the situation may be as shown in figure 2b. In the former case, the equilibrium is stable, assuming that short-period expectations adjust according to equation (8); but in the latter case the equilibrium is seen to be unstable. The unstable case occurs when the $P(e)$ line is steeper than the $P = e$ line, which requires large values of I' and E' or that investment is highly responsive to changes in E , and E is highly responsive to changes in e ²⁰; a large value of α also makes instability more likely. A third

¹⁹ This relationship has some similarities with Hicks's (1939) notion of the dependence of expected price on price. For Hicks (1939, pp. 204–205), changes in current prices possibly change firms' expectations regarding future prices because firms may extrapolate the present into the future. Here, changes in firms' short-period expectations may cause changes in long-period expectations because firms extrapolate the nearer future into the more distant future. For a similar comparison of Keynes and Hicks, see Davidson (1978, pp. 379–386).

²⁰ The similarity with Hicks (1939) is apparent again. While Hicks (1939, p. 205) defines the elasticity of expectations as the ratio of the proportional rise in expected prices of the commodity to the proportional rise in its current price, we may define it for our purposes as the ratio of the proportional rise in E divided by the proportional rise in e . Hicks (1939, pp. 254–255) states that a high value of this elasticity (when it is greater than unity) will imply instability; here, too, a high value of this elasticity will imply instability (although the case of unitary elasticity does not play a special role in the present analysis).

possibility is the case of multiple equilibria. If the $P(e)$ line is convex from below, there could be two equilibria, the lower one stable and the upper one unstable. In this case, unless the economy starts from above the unstable equilibrium, it will converge to the stable equilibrium. But if the $P(e)$ line happens to show fluctuations in its second derivative (possibly because initially increases in e increase E at an increasing rate, but at higher levels it does so at a decreasing rate) there may be several stable equilibria.

Three implications of this analysis of the shifting model need to be noted. First, short-period equilibrium may be unstable. Second, in the case of multiple stable equilibria, the short-period equilibrium position of the economy will depend on the economy's starting point. Third, if the stable equilibrium is unique, then the equilibrium position will be independent of the dynamic path that takes the economy to that equilibrium. This follows because, at the equilibrium, equations (5), (6), and (9)—which solve for the unique equilibrium values of the three variables P , e , and E —must be satisfied. These remarks imply that the shifting model has dealt some telling blows to the sanctity of the method of confining attention to short-period equilibrium states without examining the dynamics outside equilibrium, but the blows are not fatal. The first two implications clearly undermine the equilibrium notion. If equilibrium is unstable, then it is meaningless to study the equilibrium state as a depiction of the actual state of the economy; Keynes' notion of underemployment equilibrium loses its practical relevance. If there are several stable equilibria, then where the final equilibrium will be cannot be known without knowledge of the position(s) of the economy before it reached equilibrium. The last implication, however, still keeps the equilibrium method alive, since if the economy has one stable equilibrium (and this is true in the neighborhood of a particular equilibrium in the multiple-equilibria case as well), the equilibrium will be independent of the dynamic path by which it gets there, so that one can analyze the properties of the equilibrium without worrying about the history of the economy prior to its getting there.

However, this path-independence of equilibrium is obtained because we have assumed that the dependence of E on e takes a simple form given by equation (9), which states that the current level of E depends on the current level of e , so that even the most recent past plays no role in affecting long-period expectations. If we allow the firm to have some memory, E can be assumed to depend on lagged values of e as well.

Figure 2a

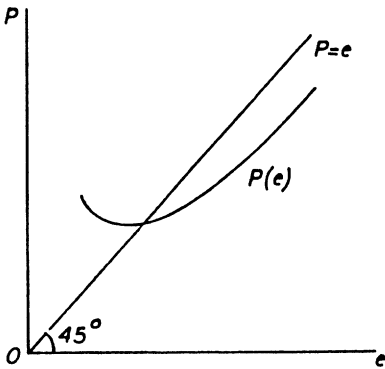
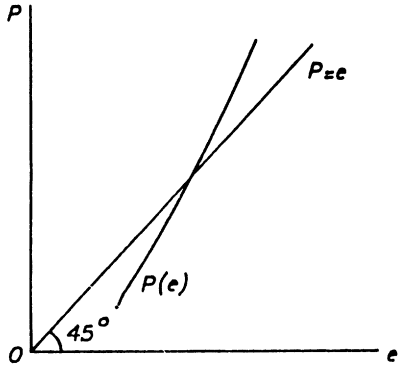


Figure 2b



Thus, when e is changing (so that P is not equal to e), we may assume that:

$$(11) \quad E_t = \sum_0^T k_{t-i} e_{t-i},$$

(we write this in discrete time notation for expositional clarity), when e differs from P , where k_j are weights, and where T is the length of the firm's memory.²¹ When $e = P$, we assume that e does not change and E also does not change. It should be noted that in this event, equation (11) no longer holds since $e = P$ only shows that e does not change, but since past e 's are different, if equation (11) held, over time E would change, violating the assumption that E becomes constant when $e = P$. If these assumptions are made, the final equilibrium becomes path-dependent, since the level of E will depend on the path of e , and since E stops moving as soon as $P = e$, there is no guarantee that the level of E at which $P = e$ will be the same irrespective of the initial starting point.²²

This case of interdependence of e and E seems to deal a fatal blow to the equilibrium method: we cannot know where the economy will end up in short-period equilibrium unless we study the path of the economy

²¹ The analysis would not change fundamentally if we assumed that past prices, and not price expectations, affected the firm's long-period expectations. This is because P depends, at any point in time (in addition to other things), on e .

²² The analysis here stresses adaptive expectations and memory, and nothing is said about new innovations and creative expectations that can affect long-period expectations independent of memory and existing information (see Shackle, 1972; and Davidson, 1991). These latter factors are frozen in our analysis to allow us to focus on the role of the former factors in causing path-dependence. Changes in the latter may have the effect of changing the parameters in equation (11) in an unpredictable manner, rendering the precise position of equilibrium incalculable, but they would not change the qualitative nature of our analysis regarding path-dependence.

outside equilibrium. History matters, and determines the position of the economy in equilibrium.

Is the shifting equilibrium model a plausible one? There is no inherent reason why the disappointment of short-period expectations must make firms revise their long-period expectations, since their long-period expectations have had no chance to be disappointed. However, Keynes (1936) argues that in an uncertain environment economic agents often fall back on conventions, and one such convention is that they extrapolate the present into the future. If this is the case, changes in short-period expectations can be expected to affect long-period expectations. But the shifting equilibrium model does not guarantee the path-dependence of equilibrium. Then the question arises whether the conditions for path-dependence are plausible. Since firms have some memory, it is plausible that when forming long-period expectations, they should not just be affected by the short-period expectations they currently hold, but also by the expectations (or actual prices) that they held (observed) in the recent past. But we also found that for path-dependence we needed an asymmetry between how expectations are formed when short-period expectations are realized and how they are formed when they are not. Note that the sharp asymmetry regarding the role of memory between the two cases—where memory is assumed in the case of disappointed expectations and the realization of expectations results in no change in long-period expectations irrespective of the past—is not necessary for our result. All that we require is that the memory period (T) is longer when short-period expectations are disappointed as compared to when they are realized (we assumed an extreme case when there was no memory when $e = P$).²³ It seems quite plausible that firms—like individuals—tend to remember the past, and to be affected by it, more when they make mistakes than when they do not. It should also be noted that, more generally, path-dependence will arise if the weights of the long-period expectations function change over time.

4. Some implications for Keynes, the neo-Ricardian Keynesians, and the Post Keynesians

We now examine the implications of our analysis for the notion of equilibrium used by Keynes, the neo-Ricardian Keynesians, and the

²³ If the memory periods were the same (so that equation [11] always applies), in final short-period equilibrium, when E does not adjust any more, the final equilibrium will be path-independent.

Post Keynesians,²⁴ taking the shifting equilibrium model with path-dependence to be the one that correctly portrays actual economies.

4.1. Keynes

Kregel (1976) argues that Keynes uses both the stationary and shifting equilibrium models in *The General Theory*. However, it does appear that, in his more “formal” analysis, he confines attention to the stationary equilibrium model, assuming that long-period expectation is given, and then goes on to show how unemployment equilibrium is determined by the principle of effective demand. In his 1937 lecture notes, Keynes (1973) goes even further, writing:

[I]f 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. For other economists, I find, lay the whole emphasis, and find the whole explanation in the *differences* between 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. [p. 181]

Keynes wanted to show that “the theory of effective demand is substantially the same if we assume that short-period expectations are always fulfilled” (1973, p. 181). If, following Keynes we use the static model, there is no room for path-dependence, because even if we allow for the type of relationship between short- and long-period expectations we discussed in the previous section, since short-period expectation is always realized, e is never changed, so that E stays constant as well. Thus, whether one uses the static or the stationary model, it appears that the short-period equilibrium becomes path-independent.

How seriously, then, should we take the problems with the equilibrium method discussed above, when Keynes appears to have slighted them? In answering this question, we distinguish between two distinct purposes for which the equilibrium method can be used. The first is to examine some qualitative property of the equilibrium position, and the second is to attach some real-world significance to the precise position

²⁴ The terms “neo-Ricardian Keynesians” and “Post Keynesians” are used in the sense they are used in Dutt and Amadeo (1990). The former are those Keynesians who combine Sraffa’s critique of neoclassical theory and Keynes’ theory of effective demand to show why unemployment equilibrium exists. The latter refers to a more heterogeneous group of Keynesians who stress the role of historical time, uncertainty, and money.

of that equilibrium. If we take the view that Keynes' main purpose in *The General Theory* was to show that unemployment equilibrium could exist, in the simplest and clearest way possible, it follows that he was interested in a qualitative *property* of the equilibrium position, not in its precise *position*. Thus, issues regarding the path-dependence of equilibrium, and the role of history, were no concern of his; wherever the economy ended up, it was possible for it to end up with unemployed labor. To show this in a simple manner, he wanted to abstract from issues like the disappointment of expectations. He also wanted to show that the disappointment of expectations was not the cause of unemployment, and thus it was tactically necessary to assume that expectations were not disappointed.²⁵

It may be argued that Keynes not only wanted to focus on the qualitative property of his short-period equilibrium—that unemployment could exist at it—but also to use his equilibrium concept to examine how the actual economy would move from one position to another. After all, he did stress the multiplier mechanism, and recommended the use of fiscal expansion when the economy was in a state of unemployment equilibrium. Our notion of path-dependence developed in the previous section does not undermine the *qualitative* analysis that Keynes offered. Starting from a position of unemployment equilibrium, expansionary fiscal policy would (in the absence of exceptional intervening circumstances that could reverse the outcome due to path-dependence) increase the level of income and employment. What our analysis potentially undermines is the *quantitative* estimation of the exact implications of a given policy change. If the long-period expectations function (equation [11]) changes over time (in an unpredictable way), or if the speed of adjustment coefficient changes over time (also in an unpredictable way) in the short-period expectations revision function (equation [8]), or if after the policy change occurs the economy is subjected to reversible exogenous changes, the position of the final short-period equilibrium cannot be known without complete knowledge of the dynamic path, which, of course, given our assumptions of unpredictability, is impossible. Thus, the exact prediction of the effects of fiscal (and monetary) policies becomes impossible. Fine-tuning the economy, based on the estimated

²⁵ It is worth stressing that his result that unemployment can exist in equilibrium does not depend on assuming either that short-period expectations are realized, or that long-period expectations are given. This is in striking contrast to the role that the assumption of rational expectations plays in the new classical demonstration of policy ineffectiveness.

parameters of the equilibrium model, becomes impossible. At best, active policy can work by pushing the economy in some desirable direction, not to some exact goal, as some more technocratically inclined “Keynesians” have thought possible.

4.2. *The neo-Ricardian Keynesians*

The neo-Ricardian Keynesians use Sraffa’s pricing model, taking as given the level and composition of output, techniques, and distribution, and find the price vector that equates the rate of profit between sectors (an equality that comes about because of the classical competitive process).²⁶ This analysis, they argue, reflects the dominant and persistent forces of the system. What is most relevant for our purposes is the fact that in this analysis expectational issues do not find any room.

There seem to be three reasons given by neo-Ricardian Keynesians to justify this treatment of expectations. First, they argue that expectations do play some role in affecting market prices, but this puts expectations in the same category with other accidental or transitory events. The reason why they are transitory is that these effects are eventually obliterated, since in equilibrium what happened when the system was not at equilibrium does not matter. Second, they believe that if expectations are given a prominent role in the analysis, no unambiguous conclusions can be drawn and no definite results can be obtained from the analysis (Garegnani, 1978, 1979). Third, following their view of classical economic analysis, and as a result of their opposition to the subjectivist marginalist analysis, neo-Ricardian Keynesians want no truck with expectations, given their subjective nature. Thus, they try to bypass expectations and to relate the factors explaining equilibrium positions directly to individual actions (Garegnani, 1976). The neo-Ricardian Keynesians cannot ignore expectations just because they are subjective—since it begs the whole question as to why subjective factors can be left out of their economic analysis. Thus, their method makes sense if individual actions and states of the economy can be reduced completely to factors other than expectations.

Our analysis in the previous section refers to the path-dependence of short-period equilibrium, while the neo-Ricardian notion of equilibrium (or position) refers to the long period, in which rates of profit are intersectorally equalized. However, the kinds of expectational issues discussed in our analysis are relevant for neo-Ricardian analysis as well,

²⁶ See Dutt and Amadeo (1990) for a fuller analysis.

which makes it legitimate for us to examine this aspect of neo-Ricardian method in terms of our earlier analysis.

The first reason given seems to be open to serious question if the equilibrium position is path-dependent: expectational issues cannot be dismissed simply on the grounds that they are transitory, because the final equilibrium is path-dependent, and what happens in the path is determined—as the neo-Ricardian Keynesians admit—by expectations. It may nevertheless be claimed, as in Keynes' analysis, that the qualitative properties of the equilibrium position may be left intact by the path-dependence of equilibrium. However, the neo-Ricardian Keynesians cannot find much comfort in this defense because, whereas in Keynes' analysis the qualitative property of equilibrium (that it is consistent with unemployment) was actually deduced from the analysis, the main qualitative property of neo-Ricardian analysis (that the rate of profit is equalized intersectorally) is an assumption, and not a deduction. In fact, the neo-Ricardian Keynesian demonstration that unemployment can exist because the interest rate mechanism cannot equate saving and investment since the capital employment schedule is perversely sloped already utilizes the assumption that equilibrium is path-independent, and that expectations do not matter.

The second argument, that to get definite results we need to ignore expectations, is problematic. If nothing definite can be said about expectations, it is at least as justifiable to argue that nothing definite can be said about economy, as to argue that expectations should be ignored. Fortunately, as we have discussed above, the belief that expectations are important and lead to the path-dependence of equilibrium need not push us to a nihilistic position; we are still allowed to say definite things about the qualitative properties of equilibrium states, and about the qualitative (directional) effects of changes in parameters. The neo-Ricardians, who examine the implications of parametric shifts based on their price determining model, which leaves out expectational issues *from the start*, cannot find much solace in this more limited role of equilibrium theorizing, since by ignoring expectational issues completely they do not explore whether their results regarding parametric shifts are qualitatively robust. Their defense that they are concerned only with *notional* changes, holding all their other data constant (Garegnani, 1983), is problematic since it is not clear to what extent such notional changes have any relevance for what one may expect to happen in actual economies.

The third argument is based on the idea that (long-period) equilibrium can be related to factors that depend only on the objective features (the

givens of Sraffian analysis mentioned above) of the economy, and not at all on expectational factors. If, however, as we have seen from our shifting model, the equilibrium is path-dependent, expectational issues do affect the equilibrium, so that the argument is open to serious question.

4.3. *The Post Keynesians*

Our analysis appears to support the ideas of Post Keynesians who view equilibrium theorizing with some distrust. G.L.S. Shackle, Joan Robinson, and others have argued against equilibrium theorizing, because in their opinion it does not deal appropriately with the role of history.²⁷ Our notion of path-dependence makes precise the notion that the history of economy affects the position toward which the economy tends, so that the analysis of equilibrium positions, forgetting the history of the economy, is seriously misleading. Our analysis also provides a precise example, consistent with the Post Keynesian emphasis on uncertainty and expectations, why this type of path dependence may arise.²⁸

This said, it should be pointed out that this analysis does not support the extreme view of some Post Keynesians that the notion of equilibrium is completely useless for understanding the real world. This critique of the notion of path-independence of equilibrium was made using the notion of market period equilibrium. More importantly, this analysis shows that equilibrium theorizing, which “tames” expectations in the way Keynes did by using his stationary (or static) equilibrium model, can be very useful for understanding the qualitative properties of the economy, or of understanding in a rough, qualitative way, the effects of changes in the givens of the model. What our analysis does imply, however, is that equilibrium models should not be taken so seriously as to suppose that they can give us a precise, and quantitative, understanding of the real world just because the equilibrium models give such precise and (in the case of econometric and computable models) quantitative results.

²⁷ See Hamouda and Harcourt (1988) and Dutt and Amadeo (1990) for a fuller description and for references to the Post Keynesian literature. But note that the former use the term “Post Keynesian” in wider sense than is used here.

²⁸ There may be other reasons why path-dependence may arise, some of them emphasized in recent mainstream discussions on hysteresis in unemployment (see Cross, 1988), and others due to long-run irreversibilities of the money wage and the stock of capital.

5. Conclusion

This paper has attempted to clarify Keynes' concept of equilibrium in the presence of uncertainty by formalizing Kregel's notions of static, stationary, and shifting equilibrium models using a simple framework for analyzing the economy, based on chapters 3 and 5 of Keynes' *General Theory*. The static model, which assumes that short-period expectations are always realized, shows clearly the notion of unemployment equilibrium as determined by Keynes' principle of effective demand. The stationary model allows short-period expectations not to be realized, but "tames" uncertainty by taking long-period expectations as given; it too, is able to show clearly that unemployment can exist in equilibrium. The shifting model, by allowing long-period expectations to change, and to interact with short-period expectations, opens up the possibilities of the instability of equilibrium, the existence of multiple equilibria, and most important, the path-dependence of equilibrium.

Keynes generally tried to tame uncertainty by using the stationary model (and after writing *The General Theory* he in fact advocated the use of the static model). The use of this procedure allowed him to show clearly how equilibrium was determined, and how equilibrium was consistent with the existence of unemployment. However, if, in the real world, long-period expectations do in fact interact with short-period expectations, and they do so in the manner (discussed in the paper) that causes path-dependence, this procedure does not allow him to obtain the precise position of equilibrium, since it ignores the disequilibrium path of the economy. If the world is best described by the shifting equilibrium model, then we have argued that the neo-Ricardian Keynesian notion of equilibrium or long-period positions may be open to serious criticism. While our analysis certainly does not imply the abandonment of the notion of equilibrium, it does show that Post Keynesian concerns about the importance of history and the difficulties regarding the equilibrium method may be justified.

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