
A Simple Rational Expectations Keynes-Type Model

Author(s): John Bryant

Source: *The Quarterly Journal of Economics*, Vol. 98, No. 3 (Aug., 1983), pp. 525-528

Published by: The MIT Press

Stable URL: <http://www.jstor.org/stable/1886025>

Accessed: 18/10/2008 12:16

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=mitpress>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit organization founded in 1995 to build trusted digital archives for scholarship. We work with the scholarly community to preserve their work and the materials they rely upon, and to build a common research platform that promotes the discovery and use of these resources. For more information about JSTOR, please contact support@jstor.org.



The MIT Press is collaborating with JSTOR to digitize, preserve and extend access to *The Quarterly Journal of Economics*.

A SIMPLE RATIONAL EXPECTATIONS KEYNES-TYPE MODEL*

JOHN BRYANT

The rational expectations school of macroeconomics (e.g., Lucas and Sargent [1981]) and recent models of the Great Depression as banking collapse (e.g., Bryant [1981]) provide a micro-foundation for a version of monetarism. It is tempting to conclude from this that the tools of rational expectations, and more generally micro-foundations, themselves "argue" against Keynes [1935]. This conclusion is wrong. We demonstrate the falseness of this conclusion by counter-example.

Our example is a simple micro-foundation model in which there is a continuum of rational expectations underemployment equilibria quite independent of monetary policy or the financial system. Indeed, the model imposes no role for money, bonds, or a financial system. Moreover, in the model rational expectations equilibria themselves are without adequate micro-foundation.

Our Keynes-type model has two crucial ingredients, specialization and imperfect information. While we label the model "Keynes-type" because of its results and not because of these assumptions, the author does feel that these assumptions may parsimoniously capture at least an aspect of Keynes's argument (see also Salop [1982]).

Indeed, the author is making no claims of originality in this paper, but rather is providing a simple reminder of Keynes's contribution to macroeconomics and of the fact that the increased rigor of modern monetarism does not by itself carry the day. The debate is just sharpened.

I. A KEYNES-TYPE MODEL

Let us turn to our simple model. There are two consumption goods, leisure and a single commodity. Our economy is inhabited by nN identical individuals, $n > 1$, with n permanently located at each of N separate sites, $N > 1$. Each individual is endowed with L units of leisure and has the common nicely shaped utility function $U(C_1, C_2)$, where C_1 is the individual's consumption of leisure and C_2 is the individual's consumption of the commodity.

* I wish to thank Jerry Green, Edward Prescott, and anonymous referees for helpful comments. Errors and oversights are my responsibility alone.

The commodity is produced from leisure in two stages. In the first stage of production, N intermediate goods are produced on any scale from leisure, one for one, one intermediate good at each of the N separate sites. Crucially, all communication or observation between the N sites is impossible until after the first stage of production. In the second stage of production the commodity is costlessly fabricated anywhere and on any scale from the intermediate goods to yield $N \min\{I_1, \dots, I_N\}$ units of the commodity from (I_1, \dots, I_N) units of the N intermediate goods.

This production technology is, of course, very artificial and simple. Nevertheless, it may capture the essence of the specialized, multi-staged, and decentralized production that characterizes an advanced economy. The intermediate good can be interpreted as a specialized labor service or as the production of a component part. Admittedly the fixed proportion characteristic of the production technology, while of considerable practical interest, is special. Moreover, it is the fixed proportion characteristic that delivers (below), the multiple rational expectations equilibria being a continuum as in Keynes [1935]. The continuum is not general, which is not to say that it fails to characterize, at least approximately, advanced economies. However, our main interest in the model is as counterexample to the apparent inconsistency of rational expectations and Keynes's views. Naturally, the logical force of our model as counterexample is not blunted by any special character it may exhibit.

As it stands, the model lacks an allocation device (see Lucas [1980]). Even the usual *deus ex machina* of an auctioneer generating competitive equilibrium does not work well. After the first stage of production a set of prices that allocates the entire maximal output of commodity to the suppliers of the scarce intermediate good(s) is competitive. Instead, we assume that at each site individuals collude in the first stage of production to equalize work, and collude in the second stage of production to withhold any excess intermediate good from "the market." Then we appeal to symmetry to assert that the commodity is divided equally among individuals. This seems to be bending over backwards in favor of "the market."

Now we consider the salient Keynes-type results of this model.

1. Multiple Equilibria

In this Keynes-type model there is a continuum of perfect foresight (rational expectations) underemployment equilibria. Indeed, let \bar{I} satisfy $U_1(L - \bar{I}, \bar{I})/U_2(L - \bar{I}, \bar{I}) = 1$. Then $I_1 = I_2 = \dots = I_N =$

I is a perfect foresight equilibrium for all $I \in [0, \bar{I}]$. For suppose that the individuals at site N , say, expect $\min \{I_1, \dots, I_{N-1}\} = I$. Then for $I_N \leq I$ the individuals at site N expect to receive $C_2 = I_N$, and for $I_N > I$ they expect to receive $C_2 = I$. Therefore, for $I \leq \bar{I}$ their utility is maximized by $I_N = I$, and for $I > \bar{I}$ by $I_N = \bar{I}$.

2. Irrationality of Rational Expectations Equilibria

As something of an aside, we note that in this Keynes-type model there is nothing particularly rational about rational expectations equilibria. An individual expecting one of the equilibria, or indeed an equilibrium, to occur with certainty does not seem particularly rational. If the structure does not imply a single outcome, why should the individual expect a particular outcome? Indeed, a single equilibrium (and the set of equilibria) is of linear measure zero in the set $X_N[0, \bar{I}]$. There is no consensus as to how to characterize the uncertainty in such a model [Bryant, 1982; Lucas, 1980]. However, even if all we rule out is individuals acting as if they are using a common particular discrete measure, then rational expectations is exactly irrational. One might predict that an excess supply of intermediate goods is generic in this model.

3. Government

As it stands, the model has no role for government. A central feature of Keynes's contribution to macroeconomics is a role for government. To add a role for government, we allow coordination of activity between sites with a public good technology. That it is a public good coordination technology explains why this is a model of government activity rather than a model of the firm.

Now we describe this governmental role. For simplicity suppose that the first stage of production at the sites is costlessly observable from outside the sites, but communication with the sites is not. Specifically suppose that coordination of activity between the sites in any scale has the fixed intermediate good cost $(nC, \dots, nC_{1 \times N})$. Because the coordination of activity is a natural monopoly, it poses well-known problems for the private economy. How does a coordinator recover cost? Suppose, however, that government prohibitions are costlessly enforced and lump sum taxes costlessly collected. Moreover, suppose that first-stage production decisions are costlessly reversible. The government prohibits the private coordination of activity between sites. Then the government observes the first-stage production decisions. If it judges it worthwhile, the government then intervenes to coordinate activity. The intervention is "financed" by equal lump sum

taxes of C per individual. Given that the government observes a rational expectations equilibrium, $I_1 = I_2 = \dots = I_N = I$, the intervention rule is conceptually simple: intervene if $\max_W U[L - W, W - C] > U[L - I, I]$. As the result of this governmental activity is the best result feasible, it is justified.

In this model coordination of activity could take a very simple form. A technology for the sequential communication (or observation) of leisure input at each site to (by) the other sites suffices [Bryant, 1980]. For let W^* satisfy $U[L - W^*, W^* - C] = \max_W U[L - W, W - C]$. Suppose that the N th site observes $I_1 = I_2 = \dots = I_{N-1} = W^*$. Then the N th site sets $I_N = W^*$. Therefore, if the $N - 1$ st site observes $I_1 = I_2 = \dots = I_{N-2} = W^*$, it sets $I_{N-1} = W^*$, and so on. Therefore, site 1 sets $I_1 = W^*$. However, it might be, for example, that the least cost coordination technology is the government directly hiring leisure services with promises of commodity (money?).

II. CONCLUDING COMMENTS

There are at least three ways to read this paper. First, it helps to provide insight into the implications for the basic structure of the economy of Keynes's results. Second, it lends support to the belief that Keynes's results characterize the economy. Last, it lends support to the belief that almost anything can be modeled as optimizing behavior. As indicated in the introduction, the author is inclined toward the third reading.

RICE UNIVERSITY

REFERENCES

- Bryant, John. "Competitive Equilibrium with Price Setting Firms and Stochastic Demand." *International Economic Review*, XXI (1980), 619-26.
- . "Bank Collapse and Depression." *Journal of Money, Credit and Banking*, XIII (1981), 454-64.
- . "Perfection, the Infinite Horizon and Dominance." *Economics Letters*, X (1982), 223-29.
- Keynes, John. *The General Theory of Employment, Interest and Money* (New York: Harcourt, Brace & World, 1935).
- Lucas, Robert. "Methods and Problems in Business Cycle Theory." *Journal of Money, Credit and Banking*, XII (1980), 696-715.
- , and Thomas Sargent, eds., *Rational Expectations and Econometric Practice* (Minneapolis: University of Minnesota Press, 1981).
- Salop, Steven. "Buy American—Save Your Job?" Georgetown University Law Center, 1982.