

Rational Behavior with Deficient Foresight

Omar F. Hamouda and John N. Smithin*

INTRODUCTION

Although there has recently been a revival of some broadly “Keynesian” ideas and concepts in macroeconomics, under the label of “New Keynesianism” (Colander, 1988), the so-called rational expectations hypothesis (REH) remains a major element in these theories.¹ By now, it is widely accepted by both “New Keynesian” and “New Classical” economists that the REH has entirely supplanted the adaptive expectations hypothesis (AEH), of (e.g.) Cagan (1956) and Nerlove (1958), even though the latter was the mainstay of most orthodox models for some two decades.

However, the recent developments still do not squarely address some of the important issues involving uncertainty and expectations formation which were originally raised by Keynes (CW VII, CW XIV, pp. 109–23),² and have subsequently been taken up by economists such as Shackle (1949, 1967, 1973, 1974), Davidson (1972), and Loasby (1976). Unlike the AEH, this alternative view has not been entirely eliminated from the literature, although clearly it has not had a comparable degree of influence on the majority of the profession as the REH. The alternative approach, which stresses fundamental uncertainty in Keynes’s or Knight’s (1921) sense (as opposed to mathematical risk), does not have as neat an identifying label as the REH or AEH. However, Coddington (1982, 1983), in a highly critical discussion, has recently used the term “Deficient Foresight” (DF) to refer to the associated set of concepts and ideas, and although this term may be misleading in a number of respects, it will be convenient to adopt it as a shorthand here.

If, as plausibly claimed by Lawson (1985, p. 909), fundamental uncertainty is a “pervasive fact of life,” the dismissal of the DF approach by a majority of economists requires some explanation. One possibility may be that it is widely believed that the use of DF concepts entails modelling the behaviour of economic agents as being “irrational” in some sense. After all, the success of arguments in this vein led to a fairly rapid demise of adaptive expectations once the REH appeared on the scene, and it may be felt that similar considerations suffice to dispose of the DF approach also. Alternatively, there is also, apparently, a view that even if the profession were prepared to grant more theoretical respectability to DF than it allows the AEH, nonetheless the DF approach is outmoded on purely technical grounds.

In this paper, however, we argue that, in fact, the DF approach is likely to have more staying power than adaptive expectations. Although proponents of the REH were able to demonstrate that agents in adaptive expectations models are clearly not “rational” in the sense in which this term is widely understood by economists, the same is not true of agents forming expectations under genuine uncertainty in models based on that of Keynes. We also suggest that

*York University, Toronto, Canada

*York University, Toronto Canada. 4700 Keele Street, North York, Ontario Canada M3J 1P3

The authors wish to thank Brian Bixley, Paul Davidson, Geoff Harcourt, Tony Lawson, John Pheby, Ingrid Rima, Tom Rymes, Lorie Tarshis, Ted Winslow and an anonymous referee.

the argument that the DF approach is outdated on technical grounds is invalid. What is really at issue is not so much a question of whether expectations should be treated as endogenous or exogenous in any formal model, but a much more fundamental debate about the underlying nature of the world of social and economic relations.

Alternative Notions of Rationality

Clearly, as suggested above, any comparison of modern "rational expectations" with potential alternative views of expectations formation must involve taking a view on what it might mean to describe the process of both forming and acting on expectations as "rational." Barro (1984, p. 179) has argued that:

"One of the cleverest features of the rational expectations revolution was the appropriation of the term "rational." Thereby . . . opponents of this approach were forced into the . . . position of either being irrational or of modelling others as irrational . . . which are (not) comfortable positions for . . . economists."

However, it is argued here that, on the contrary, the choice of the term "rational" has been rather unfortunate, from the point of view of both adherents to the REH and their opponents, because almost all notions of rationality and what it means for agents to behave in a rational manner are fraught with ambiguity.

In particular, the invocation of the phrase "rational expectations" can easily lend itself to the connotation that what is at issue is a fairly general problem of epistemology, for example, the degree of confidence or belief that an individual is entitled to place in various propositions in economics (or in life generally) on the basis of more or less incomplete evidence. This, in turn, opens the door to debates on epistemology involving such matters as the problem of induction and related philosophical issues. Certainly, Keynes himself seemed to use the term "rational" in something like this sense, in his *Treatise on Probability* (CW VIII) and elsewhere (see, for example, CW VIII, p. 3).

It can be argued, however, that the concept of rationality as widely used by many economists today, including those involved with the rational expectations debate, is not so much concerned with the problems of epistemology as internalized by economic agents, but rather with the simple assertion that agents will in general seek to pursue, in a consistent fashion, their narrow self-interest as perceived by themselves. As pointed out by Harsanyi (1977, pp. 8–11, 16–19), it is the "goal seeking" or "goal directed" orientation of individuals with this type of motivation which potentially enables external observers to predict behaviour in a wide variety of circumstances. On this view, the epistemological problems faced by the agents themselves need not necessarily be of primary importance.³ In other words, given some indication of an agent's present understanding of the world, the assumption of selfish or maximizing behaviour may well serve as an adequate predictive tool, independently of the issue of how the agents arrive at and subjectively justify their current world view. The concept of predictable behaviour in this context, of course, does not necessarily imply unchanging, mechanical, or repetitive behaviour.

It is interesting that some of the statements of the major proponents of the REH seem to endorse this narrower view of what constitutes rationality. For example, Lucas and Sargent (1979, p. 7), when discussing the foundations of the so-called New Classical approach to macroeconomic theory, argued that this approach represents a return to ". . . the discipline imposed by classical economic theory. . .," where that discipline consists of ". . . adherence to the two postulates (a) that markets clear and (b) that agents act in their own self-interest." Clearly, in the actual development of the New Classical approach, postulate (a) has been

represented by the adoption of a Walrasian framework, while (b) is supposedly represented by the REH.

It is largely accepted, of course, that the version of the REH which has typically been incorporated into most published versions of New Classical models goes much beyond what would be required simply to maintain postulate (b). For example, in his widely cited review article, McCallum (1980, pp. 717–18), recognized the distinction between the "weak" and "strong" REH, where the weak version is simply a reiteration of postulate (b) in the context of expectations formation, but the strong version is a much more sweeping proposition. In the strong version, to be "rational," a subjective expectation of an economic variable must be equal to the conditional mathematical expectation of that variable generated by the model the agent is (explicitly or implicitly) using to form ideas about the world. The reason why the strong version has gained favor is obviously the relative ease with which this proposition can be incorporated into formal mathematical models, but the price which is paid for such formalism is precisely that the appeal to standard probability concepts is open to the type of criticism on epistemological grounds discussed above.

It is important to note that the dismissal of adaptive expectations is actually accomplished by appeal to the weak version of the REH rather than the strong. The standard argument has been that agents who form expectations adaptively (in the sense of simply applying geometrically declining weights to past realized values of the variables under consideration) are likely to be programming themselves to make systematic errors, behaviour which does not seem to conform to *any* conventional notion of the agent's self-interest. In general, therefore, it is argued that rational (in the sense of self-interested) agents should not attempt to form expectations adaptively.⁴

The triumph of the REH in its strong version, then, is seen as something of an intellectual sleight-of-hand. AEH models are dismissed by appeal to what McCallum (1980, p. 717) called the "compelling idea" of the weak-form REH, but are replaced in practice by something which goes a good deal further.

However, as is emerging in some of the more recent literature, for example, Lawson (1985), Lawson and Pesaran (1985), and Hamouda and Smithin (1988), the reason that the DF approach to expectations formation cannot simply be dismissed on similar grounds is that the agents in Keynes's model (if not in the formulations of some of the later writers who have taken up the theme) in no way violate postulate (b) above.⁵ The "deficiency" in their ability to predict future economic variables arises from the uncertainty inherent in the environment, and not from their lack of skill or "rationality" in forming judgements. Keynes's theory emerges as one of the behaviour of weakly rational (self-interested) agents under a form of uncertainty which cannot be reduced to probabilistic measurement. It is not suggested, of course, that Keynes himself actually made this claim. As mentioned, he tended to use the term "rational" in a somewhat different way. Nor does such a statement preclude further debate about what rational behaviour in a broader sense might be. It does seem to be the case, however, that, somewhat ironically, acceptance of the conventional modern notion of rationality as self-interest would also imply that the DF approach continues to pose a serious challenge to the REH. The basic point is that the issues dividing the two approaches do not really concern the assumed rationality or otherwise of the economic agents but lie elsewhere.

Keynes's Practical Theory of the Future

The distinction between the REH and DF approaches to expectations formation is often made in terms of an analogy to Knight's (1921) distinction between "risk" and "uncertainty."⁶

On this view, the REH allows only for Knightian risk, that is, it effectively assumes a world in which objective probability distributions are discernable from observed historical time series (Lucas, 1981, pp. 223–24). Keynes, on the other hand, as he made clear both in the *General Theory* (CW VII, pp. 148–50) and in the famous QJE article a year later (CW XIV, pp. 113–14), was apparently convinced of the importance of Knightian uncertainty, a situation in which the relevant probability distribution are unknown and unknowable, and may not even exist.

To the contemporary technically trained economist, for whom econometric estimation and prediction is “the sine qua non of economic science” (Rima, 1988), this position may seem capricious or even destructive. However, some recent contributions to the literature do go some way towards explaining more precisely why Keynes held this view. As recently documented by Winslow (1986), for example, Keynes came to believe that the so-called “atomic hypothesis” which, in the *Treatise on Probability* (CW VIII, pp. 276–78, 467–68), he allowed might be applicable to the material world, was definitely inapplicable to the realm of economic relationships. For example (CW X, p. 262), “The atomic hypothesis which has worked so splendidly in physics breaks down in psychics. We are faced at every turn with the problems of organic unity, of discreteness, of discontinuity . . . the assumptions of a uniform and homogeneous continuum are not satisfied.” But the assumption of atomism was also regarded as a necessary condition for the validity of conventional methods of “statistical induction” or “inductive correlation” (CW VIII, p. 468). Hence, whereas there may be some possibility of legitimate statistical induction in the natural sciences, there are severe limitations to the acquisition of information about future economic and social variables by this route. Hamouda and Smithin (1988) argue that this is why Keynes laid such stress on uncertainty *specifically* in the context of economics or social science, and Rima (1988), Rowley (1988), and Pheby (1986), point out that similar themes underlie Keynes’s well-known critical review of Tinbergen’s pioneering work in econometrics and the related correspondence (CW XIV, pp. 285–318). The relevance of this discussion is that it clearly identifies the essence of the debate as being, not about the rationality or otherwise of economic agents, but about the nature of the world of economic and social relationships within which they operate.

Even more significant from the present point of view, is that if we go back to the text of Keynes’s QJE article, it is clear that although uncertainty is taken to be pervasive, this does not mean that agents are forced to behave in an irrational manner in the sense of neglecting individual self-interest. On the contrary, it is suggested that the agents will recognize the fact of uncertainty and develop techniques for coping with it. Techniques which as Keynes puts it “. . . (save) our faces as rational economic men . . .” (CW XIV, p. 114). They are described as follows:

“. . . (1) We assume the present is a much more serviceable guide to the future than a candid examination of past experience would show it to have been hitherto. In other words we largely ignore the prospect of future changes about the actual character of which we know nothing.

(2) We assume that the *existing* state of opinion as expressed in prices and the character of existing output is based on a *correct* summing up of future prospects, so that we can accept it as such unless something new and relevant comes into the picture.

(3) Knowing that our own individual judgement is worthless, we endeavour to fall back on the judgement of the rest of the world which is perhaps better informed. That is, we endeavour to conform with the behaviour of the majority or average. The psychology of a society of individuals each of whom is endeavouring to copy the others leads to what we may strictly term a *conventional* judgement.” (Original emphasis).

These attitudes for coping with genuine uncertainty lead to a “practical theory of the future,” the salient feature of which being that whenever new and previously unknown information comes to light (the “news”) the basis of conventional valuations is “subject to sudden and violent shifts . . .” (CW XIV, p. 114). This is the feature, of course, which is responsible for the instability of private sector investment spending and is therefore the ultimate causal factor in macroeconomic fluctuations, in Keynes’s model.

It has recently been suggested by Heiner (1983, 1985) that the existence of Knightian or Keynesian uncertainty is actually likely to lead to more stable behaviour rather than less. This is due to a postulated competence-difficulty (C-D) gap on the part of economic agents which may persuade them to maintain their current behaviour in a very uncertain situation, precisely because the likely effects of a change in behaviour are themselves uncertain. Heiner suggests (1983, pp. 570–71) that this effect is actually what is responsible for whatever empirical regularities may be observed in real world data, and for “predictable” behaviour in general. However, it is clear from the above quotations that Keynes’s ideas were rather different. According to Keynes, although behaviour may be unchanging under uncertainty “unless something new and relevant comes into the picture,” it is nonetheless a key point that when there is a change in the “news” there is also likely to be a change in behaviour. It may be remarked, of course, that under genuine uncertainty, and given a sudden accretion of new information which may be relevant, the consequences of maintaining the status quo are no less dubious than any other course of action. This is one context in which the notion of conventional behaviour seems to be important. Seen from the point of view of the individual agent the safest course of action may simply be to follow the crowd.⁷

It is true that Keynes used somewhat extravagant language in describing sudden changes in conventional opinion. There are references, for example, to “vague panic fears” and “equally vague and unreasoned hopes” (CW XIV, p. 115), but it is not suggested that agents are acting against their own private self-interest (and hence being irrational in that sense) when they do “follow the crowd” during a change in the conventional basis of asset valuation. On this same topic, one might refer to the earlier discussion of expectations in the *General Theory* (CW VII, p. 155) where Keynes refers to the situation of a stock market participant and argues that “. . . it is not sensible to pay 25 for an investment of which you believe the prospective yield to justify a value of 30, if you also believe the market will value it at 20 three months hence.” The passage from which this quote has been taken has been summarily dismissed as beside the point by some commentators, (Coddington, 1983, p. 62, fn.), because it only deals with trading on “secondary securities markets.” In fact, however, it is highly relevant, because clearly precisely similar considerations apply to physical investments also. It is not “sensible” for one individual entrepreneur to expand plant and equipment in anticipation of an increase in sales, if the conventional wisdom holds that there will be a slump and other agents act accordingly. In short, when there is genuine uncertainty, agents may have no recourse but to resort to devices such as Keynes’s “conventional judgements,” and to conform to majority behaviour when those conventional judgements change. Once again, however, it should be stressed that it is the fact of uncertainty, rather than the rationality or otherwise of the agents, which is the driving force.

Interestingly enough, there is some evidence that a number of adherents to the strong REH are prepared to accept that the issue dividing them from Keynes (at least as far as expectations are concerned) is the risk/uncertainty distinction; but without apparently also accepting that it thereby becomes incumbent on themselves to demonstrate the rather strong propositions about real world economic time series that this would imply. For example, Lucas (1981, p. 223) is explicit that the REH will not “. . . be applicable in situations in which one cannot guess which,

if any, observable frequencies are relevant: situations which Knight called uncertainty." Lucas goes on (1981, p. 224) to appeal to the "recurrent" nature of business cycles as evidence that agents typically face situations of risk rather than uncertainty in the macroeconomy.⁸ In a similar vein, McCallum (1980, pp. 717–18) defended the strong version of the REH against the criticism that it unreasonably requires agents to know the underlying "true" structure of the economy, by the argument that macroeconomic models contain only a few variables whose (presumably historical) movements are not "difficult to learn about." These arguments clearly do relate to a debate about the nature of economic time series in the real world, with the proponents of the REH obviously taking a different view of the matter than did Keynes. At the same time, the discussion seems merely to brush the notion of uncertainty aside, rather than present convincing arguments as to why we might be persuaded that Keynes's insights are invalid. One might reasonably argue that the burden of proof should be the other way round. Solow (1985, p. 328) makes the case that many economic time series cannot be treated as the outcome of stationary stochastic processes "without straining credulity."

Deficient Foresight and the Formal Structure of REH Models

An alternative view about the relationship between the modern REH and Keynes's DF approach, attributable to Begg (1982a, p. 28), is that "... the *General Theory* can happily accommodate Rational Expectations." The implication is that Keynes's approach may be laid to rest in favour of the more up-to-date theory.

One argument in favour of this view, put forward by Begg himself (1982a, pp. 25–27, 1982b, pp. 19–22), and also by Leijonhufvud (1983, p. 184) is that Keynes's treatment sidesteps the issue of expectations formation for technical reasons, simply treating expectations as exogenous. It is clear from the above discussion, however, that the substantive issues involved run a good deal deeper than differences in formal modelling techniques. One might also remark that in the context of Keynes's "practical theory of the future" it is not so much a particular set of expectations that is treated as being exogenous (in the sense of being an independent variable), but rather the accretions of new and relevant information, the "news," which in turn act upon expectations, and ultimately the real variables of the economic model. It is worth stressing again that the reason that the "news" can have this effect in Keynes's model is that, in the absence of probabalistic knowledge gleaned from stationary historical time series, a change in current information may lead to substantial changes in the basis of conventional asset valuations.

Taking a somewhat different line, Begg (1982a, pp. 27–28) has also argued that the modern REH can be interpreted as including the DF approach as a special case. His point is that the formal dynamic structure of REH models will exhibit discontinuous "jumps" in the values of current endogenous variables (in order to restore the economy to a convergent path) when confronted with a genuinely unanticipated change of some kind in the current time period.⁹ This discontinuous behaviour, it is argued, is analogous to that predicted by Keynes in the event of a change in the "news." However, in the REH context the discontinuous jumps are clearly regarded as infrequent occurrences which do not preclude "rational" agents from forming and acting on expectations based on statistical induction, in most circumstances. In the "organic" world envisioned by Keynes, on the other hand, the discontinuities may be ubiquitous and it would not then be "rational" (on almost any definition) for agents to attempt to form expectations by statistical induction.

A final argument which has been made in favour of the compatibility of Keynes's views

and the modern REH concerns the distinction made in the *General Theory* (CW VII, p. 46) between "long-term" and "short-term" expectations. Here, short-term expectations involve the expected selling price of output produced with the existing capital stock, while long-term expectations relate to the stream of expected future returns from a potential increment to the capital stock. For analytical convenience Keynes (CW VII, p. 50) felt it "... safe to omit express reference to short-term expectation. . . ." Leijonhufvud (1983, pp. 185–86) has argued that if this statement can be regarded as tantamount to assuming that short-term expectations are always fulfilled, then it would be similar to the modern REH, and indeed would represent the stronger assumption of perfect foresight. The point is that the REH literature has been mostly concerned with short-run price expectations rather than with the expectation of real returns in the more remote future. However, as pointed out by Leijonhufvud himself, the fact that the first generation of REH models tended to focus on inflationary expectations was simply a product of contemporary concerns with the validity of "Phillips curve" type propositions. In principle, the REH approach should apply to long-term expectations as well, and would still be in conflict with the DF approach in this area. Also, it is only too obvious from the context of chapter 5 of the *General Theory* that Keynes's neglect of short-term expectations is a matter of convenience rather than principle. He apparently wished simply to concentrate on the issue of long-term expectations, which were regarded as more important.

CONCLUSION

Contrary to Coddington (1983, pp. 59–62) the argument in this paper leads to the view that Keynes's analysis of uncertainty involves neither "analytical nihilism" nor "analytical opportunism" (as Coddington would have it) but follows directly from a particular view of the underlying structure of the economic and social environment.

Keynes's point is essentially that, given what he took to be the "organic" nature of the economic world, observed historical time series do not provide agents with sufficient information to form probabalistic expectations of the frequency distribution type, at least for a number of variables which are relevant to economic decision making. However, this position in itself does not imply that agents will behave "irrationally" in the weaker sense defined above, or that they will be reduced to total indecision or completely capricious behaviour whenever an unforeseen event occurs. Rationality in the weaker sense merely implies that agents engage in consistent goal-directed behaviour to pursue their own self-interest as they perceive it, and Keynes's agents are rational in that sense. They do not simply throw up their hands and abandon decision making in the face of uncertainty, instead they develop a set of techniques or rules-of-thumb for coping with it. The same principle of self-interested behaviour also allows for coherent predictions of economic behaviour even when an abrupt change in "conventional judgements" has occurred.

The so-called "Deficient Foresight" approach therefore continues to pose a considerable theoretical challenge to the current hegemony of the strong-form REH. It is not possible to dismiss DF on the same grounds as the AEH. Nor is it valid to argue that DF is outmoded simply because the REH has succeeded in "endogenizing" expectations in a technical sense.

The ultimate source of disagreement is the nature of the economic world in which we live. In statistical induction from observed economic time series tenable or not? We would argue that this question must be squarely faced by the profession before the issue of expectations formation can be regarded as a closed book.

FOOTNOTES

1. P. Howitt's Innis Lecture (1986) entitled "The Keynesian Recovery" contains a comprehensive summary of recent developments. Touching on the subject of this paper, Howitt also goes so far as to argue that Keynes's "animal spirits" may be amenable to modelling in REH models, citing the work of M. Woodford on "sunspot equilibria." However, Howitt concedes (1986, p. 263, fn.) that the concept of rational expectations is "particularly strained" in this line of research.
2. References to Keynes's works are to the Royal Economic Society edition of the *Collected Writings* (CW). The original sources referred to here are the *General Theory* and the 1937 QJE article.
3. Consider the analogy to the appearance of a shark near a popular bathing beach. In those circumstances, we do not need to inquire into the thought processes of the bathers in order to predict in which direction the crowd will run.
4. In this critique, note that the worrisome issues of epistemology need not be directly involved. The agent can form almost any a priori view of the world, and it will still be true, in most cases, that to follow an adaptive rule (as opposed to fully applying the principles implied by the agent's world view, whatever that may be) will lead to erroneous predictions, even when seen ex-ante from the agent's point of view. Davidson (1982/83, p. 186, fn.) points out that in the special case where the relevant time series is stationary but not ergodic, an adaptive scheme may be optimal.
5. There continues to be debate, of course, on whether or not Keynes's model violates postulate (a). See Smithin (1985).
6. Hoogduin (1986), however, argues that there are significant differences between Keynes's and Knight's approaches.
7. It is not clear, of course, that only stable or regular behaviour is "predictable." There does not seem to be anything incongruous, per se, in predicting a radical change in behaviour in the face of a radical change in information. The analogy made in footnote (4) is probably also relevant at this point.
8. See also Lucas's remarks in Klamer (1984, pp. 44-45).
9. An example would be a model put forward by Begg himself (1980). Strictly, this was a perfect foresight framework rather than a stochastic REH model, but similar technical considerations apply.

REFERENCES

- Barro, R. (1984), "Rational Expectations and Macroeconomics in 1984," *American Economic Review Papers and Proceedings*, 74, pp. 179-82.
- Begg, D.K.H. (1980), "Rational Expectations and the Non-Neutrality of Systematic Monetary Policy," *Review of Economic Studies*, 47, pp. 293-303.
- _____ (1982a), "Rational Expectations, Wage Rigidity, and Involuntary Unemployment: A Particular Theory," *Oxford Economic Papers*, 34, pp. 23-47.
- _____ (1982b), *The Rational Expectations Revolution in Macroeconomics*, Baltimore: Johns Hopkins University Press.
- Cagan, P. (1956), "The Monetary Dynamics of Hyperinflation," in M. Friedman (Ed.), *Studies in the Quantity Theory of Money*, Chicago: University of Chicago Press.
- Coddington, A. (1982), "Deficient Foresight: A Troublesome Theme in Keynesian Economics," *American Economic Review*, 72, pp. 480-87.
- _____ (1983), *Keynesian Economics: The Search for First Principles*, London: George Allen & Unwin.
- Colander, D. (1988), "The Evolution of Keynesian Economics, from Keynesian to New Classical to New Keynesian," in O.F. Hamouda and J.N. Smithin, (Eds.), *Keynes and Public Policy After Fifty Years*, Aldershot: Edward Elgar.
- Davidson, P. (1972), *Money and the Real World*, London: Macmillan.
- _____ (1982/83), "Rational Expectations: A Fallacious Foundation for Studying Crucial Decisions," *Journal of Post Keynesian Economics*, 5, pp. 182-98.
- Hamouda, O.F. and J.N. Smithin (1988), "Some Remarks on Uncertainty and Economic Analysis," *Economic Journal*, 98, Forthcoming.
- Harsanyi, J.C. (1977), *Rational Behavior and Bargaining Equilibrium in Games and Social Situations*, Cambridge: Cambridge University Press.

- Howitt, P. (1986), "The Keynesian Recovery," *Canadian Journal of Economics*, 19, pp. 626-41.
- Heiner, R.A. (1983), "The Origin of Predictable Behaviour," *American Economic Review*, 73, pp. 560-95.
- _____ (1985/86), "Rational Expectations When Agents Imperfectly Use Information," *Journal of Post Keynesian Economics*, 8, pp. 201-207.
- Hoogduin, L. (1986), "On the Difference Between the Keynesian, Knightian, and the Classical Analysis of Uncertainty, and the Development of a More General Monetary Theory," Mimeo, University of Groningen.
- Keynes, J.M. (1971-), *Collected Writings Volumes I-XXX*, Edited by E. Johnson and D. Moggridge, London: Macmillan.
- Klamer, A. (1984), *Conversations with Economists*, Totawa, NJ: Roman & Allanheld.
- Knight, F.H. (1921), *Risk, Uncertainty and Profit*, Boston: Houghton Mifflin.
- Lawson, T. (1985), "Uncertainty and Economic Analysis," *Economic Journal*, 95, pp. 909-927.
- Lawson, T. and H. Pesaran (1985), *Keynes's Economics: Methodological Issues*, (Eds.), London: Croom Helm.
- Leijonhufvud, A. (1983), "What Would Keynes Have Thought of Rational Expectations,?" in *Keynes and the Modern World*, D. Worswick and J. Trevithick, (Eds.), Cambridge: Cambridge University Press.
- Loasby, B.J. (1976), *Choice, Complexity and Ignorance*, Cambridge: Cambridge University Press.
- Lucas, R.E., Jr. (1981), *Studies in Business-Cycle Theory*, Cambridge, MA: MIT Press.
- Lucas R.E., Jr. and T.J. Sargent (1979), "After Keynesian Macroeconomics," *Federal Reserve Bank of Minneapolis Quarterly Review*, Spring, pp. 1-16.
- Maddock, R. (1984), "Rational Expectations Macrotheory: A Lakatosian Case Study in Program Adjustment," *History of Political Economy*, 16, pp. 291-309.
- McCallum, B.T. (1980), "Rational Expectations and Macroeconomic Stabilization Policy: An Overview," *Journal of Money, Credit, and Banking*, 12, pp. 716-46.
- _____ (1982), "Macroeconomics After a Decade of Rational Expectations: Some Critical Issues," *Federal Reserve Bank of Richmond Economic Review*, November/December, pp. 3-12.
- Nerlove, M. (1958), "Adaptive Expectations and Cobweb Phenomena," *Quarterly Journal of Economics*, 72, pp. 227-40.
- Pheby, J. (1985), "Are Popperian Criticisms of Keynes Justified,?" in *Keynes's Economics: Methodological Issues*, T. Lawson and H. Pesaran, (Eds.), London: Croom Helm.
- _____ (1986), "Keynes and Econometrics," Mimeo, City of Birmingham Polytechnic.
- Rima, I.H. (1988), "Keynes's Vision and Econometric Analysis," in O.F. Hamouda and J.N. Smithin, (Eds.), *Keynes and Public Policy After Fifty Years*, Aldershot: Edward Elgar.
- Rowley, R. (1988), "The Keynes-Tinbergen Exchange in Retrospect," in O.F. Hamouda and J.N. Smithin, (Eds.), *Keynes and Public Policy After Fifty Years*, Aldershot: Edward Elgar.
- Shackle, G.L.S. (1949), *Expectation in Economics*, Cambridge: Cambridge University Press.
- _____ (1967), *The Years of High Theory*, Cambridge: Cambridge University Press.
- _____ (1973), "Keynes and Today's Establishment in Economic Theory: A View," *Journal of Economic Literature*, 11, pp. 516-519.
- _____ (1974), *Keynesian Kaleidics*, Edinburgh: Edinburgh University Press.
- Smithin, J.N. (1985), "The Definition of Involuntary Unemployment in Keynes's General Theory: A Note," *History of Political Economy*, 17, pp. 219-22.
- Solow, R.M. (1985), "Economic History and Economics," *American Economic Review Papers and Proceedings*, 75, pp. 328-31.
- Winslow, E. (1986), "Human Logic and Keynes's Economics," *Eastern Economic Journal*, 12, pp. 413-30.