Was There a (Methodological) Keynesian Revolution?

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I believe myself to be writing a book on economic theory which will largely revolutionise - not, I suppose, at once but in the course of the next ten years – the way the world thinks about economic problems (Keynes, 1935).

1. Introduction

The purpose of this paper is to examine whether, how far, and in what sense we might say that there has been a Keynesian revolution at the level of methodology. This involves an interpretation of Keynes's expression 'the way the world thinks about economic problems' as referring, not just to the content of economics, but also to the mode of thought and specific methodology employed in addressing that content. It is hard to separate content from methodology; at least here we put the accent on methodology.

The notion of a revolution in economic thought was given focus in the 1960s by the work of Thomas Kuhn (1962), who characterized the history of scientific thought more generally in terms of revolutionary transitions from one paradigm to the next. The notion of a paradigm is helpful in that it applies to scientific thought at a variety of levels. Kuhn's thesis was that scientific thought develops within scientific communities, which have shared foundations in terms of understanding of reality and principles for building knowledge, and thus methodology. The normal business of science therefore does not deal with foundational issues; these only emerge in times of 'crisis', when anomalies between science and reality come to general attention. If a new paradigm becomes dominant, it is incommensurate with the old one, since the understanding of reality, the meaning of terms, and the way of building knowledge have all changed. The content of scientific activity will also have changed, but there is a limit to how far the content of the two paradigms can be compared, other than in terms of one paradigm or another.

These matters are of course of direct relevance to accounts of the history of economic thought. It is conventional now in the history of economic thought to recognize that, in order to understand as well as possible the writing of a particular author, great efforts should be made to understand the context and intentions of the author. Perfect understanding is beyond our grasp; indeed there is arguably no such thing – even authors themselves (including Keynes) have been charged with not fully understanding their own work. But some understanding, however contestable, can be achieved. Even Foucault (1969), who identifies the most fundamental shifts of anyone in modes of thought from one age to the next, still feels justified in providing historical accounts.

And we are fortunate in the extent of Keynes scholarship on which we can draw for considering our question. Some Keynesians (notably Joan Robinson, Kaldor, Davidson, Chick and Harcourt) continued to point out where post-war economics was departing from the methodology employed by Keynes. But following the publication of the *Collected Writings* in the early 1970s, the volume of methodological analysis multiplied, generally explicitly aiming at 'what Keynes really meant', rather than imposing categories developed for application to modern economics. (This should be distinguished from categories developed in modern discourse for analysis of historical periods.) In particular, Chick (1983) and Harcourt and Riach (1997) explicitly set out to extrapolate

from an understanding of what Keynes really meant in order to offer a modern Keynesian analysis (with explicit methodological content).

We are also fortunate, in comparing Keynes's mode of thought and methodology with those of modern economics, that he was more explicit than most about his views on the fundamental nature of the social world and of the economy, ie about his ontology. It is now conventional to read the *General Theory* bearing in mind that it was written by the author of *A Treatise on Probability* (Carabelli, 1988; O'Donnell, 1989). Having said that, Keynes only occasionally made explicitly methodological statements about the *General Theory*, so much of the discussion about his methodology is inferred, as it must be for most economists. But in what follows we will draw where possible on Keynes's own account.

In considering below whether or not there has been a methodological revolution, an account of the evolution of the methodology of economics since the *General Theory* is required. But of course any such account is also contestable. Further, there is the difficult question of how far any change in methodology has been due to Keynes. Also any influence from Keynes may or may not be what he intended; popular opinion has it, for example, that Keynes was a general advocate of deficit current spending, in contrast to what can be taken from a reading of Keynes himself.

In what follows, we start with an account of Keynes's methodology which is representative of the modern attempt to understand Keynes in his intentions, against the backdrop of his context. It represents what modern scholarship can do in terms of understanding what Keynes really meant (see Runde and Mizuhara's, 2003, collection on recent thinking). This is followed by an account of how the *General Theory* was received, in methodological terms, and how economics subsequently developed. In the process, we consider how current developments in economics relate to what we have identified as the way Keynes thought about economics. The paper concludes with an assessment of the idea of a methodological Keynesian revolution.

2. Keynes's Methodology

In providing an account below of Keynes's methodology in such a way as to provide a comparison with modern methodology, we focus on a range of themes, which we address in turn.

2.1 Philosophy of Science

Before he engaged with economics, Keynes was concerned with the theory of probability, in the sense of reasonable grounds for belief (Keynes 1921). The notion of 'belief' reflected Keynes's close study of David Hume, who had resolved his skepticism about the scope for reason by arguing that reason requires a foundation in conventional belief. Keynes argued, like Hume, that reality, and in particular social systems, are organic (in the sense of evolving and complex, with interrelations which are also evolving). There is therefore very little scope for certain knowledge. Since most knowledge can only be held with uncertainty, how can we justify action?

> In metaphysics, in science, and in conduct, most of the arguments, upon which we habitually base our rational beliefs, are admitted to be inconclusive in a greater or lesser degree (Keynes, 1921, 3).

Keynes set out the procedures employed (by philosophers, by policy makers and by agents) as follows (see further Dow, 2003). We have direct experience, and other sources of evidence. On the basis of this we develop theories about the causal mechanisms at work in reality, applying reason as far as we can. But evidence and reason are inadequate as a basis for action. So we supplement them with conventional opinion, expert opinion, extrapolating from the past more than is justified (given our knowledge that structures evolve), and the critical ingredient of what Hume referred to as 'sentiment', or what Keynes called instinct, or animal spirits. Where the body of evidence is particularly limited, and therefore confidence in our assessment of probability low, instinct or animal spirits will encourage inaction. However, if confidence in our assessment is high, decisions as to action are more readily taken.

Since Keynes understood economic knowledge as being built up in this way (economists too facing uncertainty), we will see how his theory of probability led him to a particular methodological approach. Questions of knowledge were fundamental to him. Further, as Coates (1997) explains, Keynes's thinking continued to progress beyond the *Treatise*, in line with that of philosophers such as Wittgenstein and Ramsey. But in applying this thinking to economics, Keynes (1936a, xxiii) had to contend with 'habitual modes of thought and expression' in economics, notably what he identified as the Ricardian/Marshallian tradition. In communicating this in the *General Theory*, he was concerned to address fellow-economists. Keynes himself was engaged in a 'long struggle of escape' (ibid.), and, as the letter to Shaw quoted above indicates, he did expect others would follow.

2.2 Generality

It is no accident that the word 'general' appeared in the title of the *General Theory*. The more obvious sense in which the theory was general was that it applied to the macroeconomy, in particular the determination of output (which was conventionally taken as given), and to the short period as well as the long period. Keynes was thus concerned to relax assumptions underpinning contemporary economics which he saw as unduly restrictive (Gerrard, 1997, 169). Full employment equilibrium for Keynes was a very special case; allowing output and employment to vary was more general.

But the *General Theory* was also general in the sense of Keynes's underlying theory of knowledge. The limited scope for certainty for economic actors meant that the state of confidence in expectations could shift discretely, changing the demand for money and long-term investment plans, for example. Without the foundation of rational individual behaviour (based on certain knowledge) with scope for certain knowledge, the foundations of conventional microeconomics, as well as macroeconomics, were challenged. For the policy-maker, too, there was the underlying problem of being unable to predict with certainty the outcome of policy actions (O'Donnell, 1989). But at least policy could be addressed to the central issue of the state of confidence in market expectations, and knowledge of those economic relations which governments held with

some confidence. The most important difference at the methodological level, that Keynes analysed behaviour under uncertainty as the general case, therefore had direct implications for theory and policy. But, as we shall see, it also had profound implications for Keynes's methodology. Prevailing theory, which he referred to as 'classical' economics, therefore, in all these respects, referred to a special case.

2.3 Open-system Theorising

It is common now to analyse Keynes's methodology in terms of open systems theorizing (eg Chick and Dow, 2001). Open systems are defined in different ways. Lawson (1997) for example defines them in opposition to closed systems. A closed system is one where there is both extrinsic closure (no force for change from outside the system) and intrinsic closure (no force for change within the system – the elements are atomic). It is characterized by event regularities, and yields invariant laws. Chick and Dow (2005) likewise define closed systems as satisfying all of these conditions. But open systems occur when one or more of these conditions is not met, so there is a range of possibilities for open systems – an open system is not the dual of a closed system. Thus any or all of unforeseen human creativity, non-deterministic interactions, evolving institutions, etc can make a real social system open. The implication is that economic relations cannot be captured in invariant laws. Keynes (1921) used the term 'organic' for social systems, to explain why knowledge in the form of quantitative probabilities was not in general possible.

The appropriate system of knowledge, as presented in the *Treatise,* was itself an open system, given the role of conventions and human intuition, and the appropriate methodology was pluralist. Just as Keynes talked about non-quantitative probability being based variously on direct knowledge, indirect knowledge, convention, expert knowledge, and intuition, so indirect knowledge itself would draw on a range of incommensurate methods, and follow several different chains of reasoning (Gerrard, 1997, 189). Each chain of reasoning would involve some closure to segment it from other variables and mechanisms – completely open theorizing is not practicable. But these closures are permeable and provisional, rather than the fixed closures of closed-system reasoning. Thus for example Keynes discussed in turn the implications of different assumptions about short-term expectations and long-term expectations (Kregel, 1976). Similarly, Keynes took the money supply as given for the purposes of the *General Theory*, while he had analyzed the forces which shape it (as an endogenous variable) in the *Treatise on Money* (Dow, 1997). The key is that the models he employed to segment the analysis were partial; no formal argument was capable of providing a demonstrably determinate answer.

2.4 Methodology and the Role of Formalism

The structure of the *General Theory*, with its multiple chains of argument reflects an open-systems methodology. It is helpful here to distinguish between axioms and principles. Axioms, understood as self-evident truths, are the fixed starting point for the deductive logic of a closed theoretical system. Keynes rather builds his argument on the basis of a range of principles (including notably his three psychological principles). These are best understood in the same way as Adam Smith's principles. Both after all were influenced by Newton's 'experimental' methodology, whereby principles were

formulated on the basis of experience, then employed in a provisional way to develop theory, always aware that further experience might require modifications to the principles. Thus, for example, Keynes's analysis of the consumption function was based on his psychological principle of the falling MPC, but was qualified by a range of possible disturbing factors which would need to be addressed in particular contexts.

But in considering reference to experience, Keynes was quite explicit about the ambiguity of evidence. He referred to direct knowledge based on experience in the following terms:

> Sensations which we may be said to *experience*, the ideas of meanings, about which we have thoughts which we may be said to *understand*, and facts and characteristics or relations of sense-data, or meanings which we may be said to *perceive.*
>
> (Keynes, 1921, 12, emphasis in original)

Given this imprecision at the level of experience, Keynes was wary, among other things, of analysis which presumed terms to have precise meaning. Indeed, Keynes wrote on a variety of occasions on the merits of vagueness in language (Coates, 1996, 1997; Davis, 1999). For example: 'Much economic theorizing today suffers, I think, because it attempts to apply highly precise and mathematical methods to material which is itself much too vague to support such treatment' (Keynes, XIV, 379). The reasoning therefore referred to the nature of the subject matter, understood as an open system, such that the knowledge of agents as well as economists is held with uncertainty. The issue of meaning therefore had ontological roots, rather than being purely a matter of linguistic interpretation (as in the later Wittgenstein).

More generally, Keynes proposed an alternative to deductivist classical logic, which required fixed axioms which could be taken as true (. This alternative, variously termed 'human logic' and 'ordinary logic', was adapted to analysis based on assumptions which were only provisional, and which could not be demonstrated to be true (Gerrard 1992). Rather than one deductivist chain of reasoning, ordinary logic involved several chains of reasoning, inevitably with different starting-points (which may or may not be 'principles'), and potentially employing different methods. While some of this reasoning might be mathematical, not all could be (otherwise the various chains would collapse into one formal model). While any one chain of reasoning (or model) would abstract from some aspect of reality, the important element, in putting the chains of reasoning together, was to bring to the fore those 'necessary reserves and qualifications and the adjustments which we shall have to make later on' which we had kept 'at the back of our heads' (Keynes, 1936a, 297-8). To do so is more feasible in ordinary language than in mathematics.

O'Donnell (1989, 1997) makes it clear that Keynes was not arguing against all use of mathematics in economics. Indeed in the Preface to the German edition, he addressed his inductivist readership by presenting the *General Theory* as 'formalist'. Rather he developed a logical argument that mathematical formalism should not account for all of economics. In a letter to Harrod on Champernowne's work in 1936, Keynes wrote as follows:

> I feel increasingly that one cannot think as an economist unless one's method of thought is capable of handling material which is not completely clear-cut and which is, so to speak, symptomatic thinking rather than a completely formal, watertight thinking. What one hopes is that [economists] might learn to be mathematicians and economists simultaneously, capable of keeping in their minds at the same time formal thinking and shifting uncertain material.
>
> (Keynes, 1936c)

Keynes applied the same logic to econometrics, notably in his critique of Tinbergen. O'Donnell (1997) shows that Keynes's objections were to Tinbergen's specific techniques, not to econometrics per se. His primary critique was of econometric analysis which requires an invariant structure; he argued that the onus should be on the econometrician to demonstrate that a particular case reasonably approximated a fixed structure, so that regression analysis was warranted. But he made other detailed critiques, which have proved to be influential in the development of econometrics.

2.5 Rhetoric

The fact that Keynes built up the argument of the *General Theory* using several chains of reasoning contributes to the fact that the book is not a straightforward read. Indeed Keynes himself was not satisfied with the way the argument was organized. Reflecting on the 'various criticisms and particular points which want carrying further', Keynes indicated in a letter to Ralph Hawtrey that 'the whole book needs re-writing and re-casting' (Keynes, 1936b).

Keynes was very conscious of how he expressed himself, tailoring his style to his audience. He was explicit about his attempts at persuasion. For example:

> In economics you cannot convict your opponent of error; you can only convince him of it. And, even if you are right, you cannot convince him, if there is a defect in your own powers of persuasion and exposition or if his head is already so filled with contrary notions that he cannot catch the clues to your thought which you are trying to throw to him.
>
> (Keynes, XIII, 470)

The importance of persuasion followed from the general difficulty he had explored in the *Treatise on Probability* with demonstrating the truth of arguments. This provided further justification for the range of styles in the *General Theory*. Thus, in Chapter 2, he sought to demonstrate how little it would take for the conventional model to allow involuntary unemployment. In later chapters he abandoned much of that framework, believing that he would have carried his readers with him. Similarly, in Chapter 11 he used a conventional framework to discuss the investment decision, demonstrating in fact that, according to this framework, it would never be rational to invest since there would never be enough information to form expectations with certainty. The style of Chapter 12 is quite different, focusing on how financial markets and entrepreneurs actually behave under uncertainty.

In the absence of the conditions for demonstrable arguments, Keynes used his powers of persuasion to convince readers to accept his point of view. He accepted Harrod's

arguments about how to present his theory in order to connect best with what economists already knew. He paid close attention to the criticisms of the *General Theory*, considering how better to put those arguments which he thought had been misunderstood. But, particularly given Keynes's premature death, his work proceeded to take its effect according to how it was subsequently interpreted, without further restatements from Keynes. And, given the complexities of his economics, there was scope for multiple interpretations. Further, since his *Collected Writings* were not published until the 1970s, the major impact was of the *General Theory* itself, without benefit of materials on his philosophical work.

3 The Methodology of Economics Following Keynes

Clearly Keynes did have a powerful effect on economics. He is regarded by many as the greatest economist of the twentieth century. But what exactly that effect was at the methodological level is more difficult to pin down. In what follows we focus on how far Keynes influenced the way in which economics was conducted and understood, ie its methodology. We do this in terms of the same themes as in the previous section.

3.1 Philosophy of Science

It was only in the 1980s that the relevance of the *Treatise on Probability* for Keynes's economic methodology became accepted. The *General Theory* was thus taken at face value by fellow economists outside his circle, and in isolation from Keynes's philosophy. That is, it was understood, arguably, in terms of the meanings and habits of thought from which Keynes was trying to escape. This was the case even among those normally identified as Keynesians, such as Harrod (Kregel 1980). Keynes was writing at the same time as the growth of logical positivism, the philosophy based on the proposition that only testable statements are meaningful. As we have seen, Keynes was cautious about the scope for econometrics as a means of testing theories. Indeed, his philosophy emphasized the general inability to demonstrate arguments with evidence. Nevertheless the macroeconomics which Keynes encouraged to grow, with all its data requirements, suited the logical positivist age. Keynes of course was not the sole force behind this trend; institutionalists (as in the NBER) were pursuing an agenda of data gathering, and there were other forces for government intervention (as in the New Deal) which required data. If anything, the strength of support for logical positivism can be seen as a major influence on how Keynesian economics developed.

There was a blossoming of activity around the building of macromodels and their empirical application. Meanwhile, the philosophy of science continued to evolve, as did economists' view of its implications for them. Popper, with his critique of logical positivism, was widely referred to as the main influence on economics. But, as Blaug (1980) argued, economists predominantly practiced verificationism rather than Popper's falsificationism. However, Popper had also exempted the axioms of rational individual behavior from the testing requirement, and this provided influential support for a continuation at the microeconomic level of the axiomatic approach. As the 1970s progressed, the microfoundations movement extended the role of the axioms to macroeconomics. These axioms were very different from Keynes's provisional principles, in that they were not provisional, but rather taken as self-evident. Further the

general equilibrium program, following Debreu and Hahn, deliberately detached analysis from empirical application.

Reference to Popper and Lakatos subsequently declined among economists. The conclusion has been drawn by methodologists that their relevance to economics had become very limited (de Marchi, 1988; de Marchi and Blaug, 1991). The emergence of constructivism in the 1960s and 1970s led to doubts about the scope for empirical testing as a meaningful exercise. Nevertheless, the balance has been shifting from pure theory to applied economics. In particular, experimental economics and use of surveys has been generating evidence which challenges the traditional rationality axioms and thus provokes change to pure theory. The content of the rationality axioms is now being treated by some as provisional.

3.2 Generality

While Keynes had presented his theory as general, with the classical theory a special case, leading economists quickly moved to attempt to demonstrate that the reverse was true. But the arguments were conducted at a different level from Keynes. Keynes had seen his theory as general not only in its scope with respect to the economy, but also its scope in terms of knowledge. Issues of knowledge however did not attract significant attention, relative to the *General Theory* result of the general possibility of persistent involuntary unemployment. The focus then was on showing that persistent involuntary unemployment was only possible as a special case: either because the economy was caught in a liquidity trap, or in the less special case of nominal wages being sticky downward. In terms of the model employed, these arguments held good. But the model itself involved restrictions which were at odds with Keynes's system. This is something which has been widely discussed, both in terms of the contemporary alternatives to Hicks's IS-LM system put forward by Champernowne and Meade (Young, 1987) and the later reinterpretation of IS-LM by Hicks himself (1980-81), where he admitted that inadequate attention had been paid to shifting expectations. The issue is the status of the model – is it part of a wider argument, involving additional strands of reasoning, or is it the whole argument? Is there scope for shifting expectations or not? To address the latter requires that Keynes's discussion of uncertainty be taken seriously.

The Keynes-as-a-special-case argument has evolved over the years, but always colored by being conducted within a particular model as the full argument. Thus New Keynesian models provide a more elaborate account of market imperfections as an explanation for unemployment equilibrium. Yet this literature scarcely refers to Keynes's own work. Indeed Keynes had emphasized the positive role played by the kind of institutional arrangements and conventions which New Keynesians regard as market imperfections (Davis, 1994, 1997). These elements of social structure provide stability for decision-making in the absence of certain knowledge about the future (Shapiro 1997).

The role of expectations was brought to the fore with the Rational Expectations Hypothesis, but without any scope for uncertainty. There was limited reference back to Keynes's work as an influence (Lucas 1980) and indeed the quantification of uncertainty was represented as a sign of technical progress. More recently, robust control theory, based on the rational expectations hypothesis, has attempted to grapple with model

uncertainty (uncertainty about what the true model of the economy is). But effectively the uncertainty disappears in its mathematical specification, becoming risk. And since the issue is posed in terms of the goal of identifying the 'true model', it rests on a very different methodology to Keynes's methodology. For Keynes, the nature of the economy was such that no model (ie no one chain of formal reasoning) could represent it. Yet the issue which prompted this literature is a very Keynesian one: how do central banks make monetary policy decisions in the face of uncertainty about the causal mechanisms at work in the economy?

3.3 Closed-system Theorising

To think of a model as sufficient for argument is to consider a closed system as an adequate representation of the economy, which most economists would accept as being in fact an open system. A closed-system approach involves the view that relevant variables are known (or are known to be random), and can be classified as endogenous or exogenous. A deductive axiomatic system such as general equilibrium theory is an archetypical closed system, and is the system into which Keynesian economics was squeezed in the postwar years. Any model of course is closed: variables are specified, and classified as endogenous or exogenous. It is the *role* of the model which is significant. Does it yield partial arguments or full, definitive arguments? Are the restrictions (assumptions) regarded as provisional or as fixed? Is the theory more than the model?

Much of the misunderstanding of Keynes in the neoclassical synthesis period can be said to have arisen from treating a particular model as the entire theoretical system. Thus Keynes was for long thought to have taken the money supply as exogenous, when in fact he had taken it as given (having discussed its determination in the *Treatise on Money*). Yet macroeconomics for decades was built on models which took the money supply as exogenous. As the complete argument, these models gave the money supply great causal power, and the money supply became a central policy variable. Similarly, by incorporating the explicit modeling of expectations, they too were incorporated into the closed system. Keynes had analyzed expectations (as in Chapter 12) separately from his comparison of the *mec* and the rate of interest (in Chapter 11), without any attempt to combine them. The Chapter 11 account was typical of a business plan, by which 'saves our faces as rational economic men' (Keynes, XIV, 114), ie of rhetorical significance, relative to the way in which expectations are actually formed in practice under uncertainty. Yet one of the contributions Lucas (1980) claims for the rational expectations approach is that it can 'operationalize' expectations analysis, bringing it into the (closed) system (see Vercelli, 1991, for an analysis of Lucas in relation to Keynes).

In the early years following the *General Theory*, economics was segmented into partial chains of reasoning, notably in the form of macroeconomics and microeconomics. Then it evolved into a singular, general equilibrium, system (Weintraub 1985). Now economics is seen widely as becoming more fragmented (Colander 2000, Goodwin 2000), into game theory, experimental economics, evolutionary economics, behavioral economics, complexity economics, and so on, drawing increasingly on a range of outside disciplines, such as psychology, sociology and neurology (Davis, 2006). Further, new types of evidence based on experiments and surveys are being applied to a rethinking of the characterization of individual behavior. This can be interpreted as treating the rationality

axioms as provisional in the face of experience. The ingredients seem to be there for a return to a more open theoretical system. What transpires will be influenced significantly by how thinking evolves on the question of formalism.

3.4 Methodology and the role of Formalism

Those who have noted an increasing fragmentation in the content of mainstream economics, to the extent that Colander (2000) announced the death of neoclassical economics, have also noted homogenization in terms of method. Others had discussed the emergence of mathematical formalism as an organizing principle for economics since the 1950s (see for example Blaug, 1999). But what was being noted was that, rather than being identified by content (as in general equilibrium theory), mainstream economics was now defined by its method. Thus any analysis which was not mathematically formalist, and thus not expressable in terms of a closed system, could not be classed as economics. Given what we have identified as Keynes's position on mathematics and economics, his analysis would thus be excluded. In this sense it is clear that there has not been a Keynesian methodological revolution.

In a closed system, it is important to combine all elements of the analysis in a commensurate form in order to yield, ideally, a single equilibrium outcome. It is one of the chief attractions of mathematics that it presents all arguments in a commensurate manner. But, as Keynes had argued, this is also its main shortcoming; only those elements of reality which can be expressed mathematically remain in the argument. Mathematization is not neutral (Chick and Dow, 1991). The challenge then, as Hahn has often pointed out, is in drawing any implications for a reality to which the analysis does not directly apply.

The outcome of current developments in mainstream economics will thus depend crucially on how far mathematization continues to be regarded as the *sine qua non* of theory. If individual behavior is still to be represented formally in a deterministic way, then the outcome will be rationality axioms which are more complex and deal more directly with observed behavior. Nevertheless, as the starting point for deductive classical logic, they will simply alter the content of closed-system analysis, not its form. On the other hand, if there is a new willingness to allow multiple chains of different types of reasoning, justified by a willingness to take on board the kind of creative individual behaviour and indeterminate institutional evolution which makes the future uncertain, then Keynes's way of thinking about economics will be carried forward.

3.5 Keynes, Modernism and Postmodernism

We have noted already, however, that Keynes contributed to the growth of logical positivism in economics by providing an ideal research agenda for the purpose: macroeconomics. How far this is regarded as an unintended consequence of Keynes's economics depends on how far Keynes is understood as a modernist – and on what that means. In considering Keynes's influence for modern economics, this implies that we also consider Keynes in relation to postmodernism.

Keynes has been characterized as modernist by association with the Bloomsbury Group, which encouraged his self-referential, psychologistic account of human behavior (Phelps

1990, Klamer 1995, Klaes 2006). Yet the resulting idea of the fragmented self is now more commonly associated with postmodernism (Amariglio, 1988). And modernism as a philosophy of science is also associated with logical positivism, and the idea of science as a closed expert system. In comparing Keynes's style of reasoning with Samuelson, Klamer finds Keynes the closer to postmodernism. And indeed Keynes's open-system approach seems to fit better with a postmodern approach to economics.

But this kind of discussion quickly becomes mired in different understandings of modernism and postmodernism; indeed for postmodernism this is inevitable in that it sets itself up against common understandings. The reason for raising the issue here is two-fold. First, however it is classified itself, Keynes's new macroeconomic theory and the scope for using it for policy intervention fed into a growing (modernist) confidence in science as an activity which could yield certain knowledge as a result of empirical testing. Keynesian theory in the neo-classical synthesis shed Keynes's concerns with expectations and problems of knowledge in order to become what Coddington (1976) termed hydraulic Keynesianism.

It was the failure ultimately for this approach to survive a series of structural changes in the 1970s that eroded confidence in large macroeconomic models and in activist macro policy. Expectations and information limitations came to the fore, and policy impotence stressed. As postmodernism took hold more widely in society, economics also became more modest about its own knowledge. Keynes had addressed knowledge problems and worked out an approach to building knowledge which were aimed at dealing with them. Just as with an entrepreneur, the absence of certain knowledge does not paralyze action. But in the 1990s, much of economics reacted dualistically to a loss of certainty by retreating from activism.

Most significant for our purposes was the changing attitude to methodological discussion, just as methodology itself was changing. McCloskey's pivotal 1983 article argued that, while the official discourse of economics was formalist, the informal discourse was much more pluralistic. But, while this might have been the basis for a useful debate on methodology, and the relative merits of a pluralist methodology in particular, the reverse transpired. McCloskey put the case (which Kuhn had made many years before) that there was no independent basis for any set of methodological rules. But, unlike Kuhn, for whom there is one set of methodological rules particular to each paradigm, McCloskey argued that theories succeed or fail according to how persuasively or otherwise they are presented. Methodology as a field establishing a single set of rules thus had no place. In fact methodology was already moving beyond this traditional activity to a much richer array of analyses. But the message that was absorbed more widely was that there was no point in discussing methodology. Thus, while mainstream economics is facing a number of exciting challenges which have the potential to point economics in a new methodological direction – including the kind of direction which Keynes had sought – there is a marked unwillingness to discuss it.

4 Conclusion

We have set out the modern understanding within Keynes studies of the way that Keynes thought about economics. We have found that this account differs from how the *General Theory* was received and understood at the time, and what developed as the dominant methodology in modern economics. This does not mean that Keynes had no methodological influence. Keynes in fact provided the impetus for the important development of macroeconomics in the twentieth century. The questions he posed and the model of effective demand he developed provided exciting new material for an application of logical positivism to economics. Initially this analysis was partial, segmented from microeconomic theory, somewhat in line with an open systems approach to economics as advocated by Keynes. But the axiomatic structure of conventional microeconomic theory and the subsequent general equilibrium move to derive macroeconomics from the same structure moved economics in the direction of a closed system, whereby one modeling structure could be expected to yield definitive answers. Central to this development was the growing importance of mathematical formalism as defining the subject matter of economics.

It is therefore concluded that, on balance, there has not been a Keynesian revolution at the level of methodology that is consistent with Keynes's approach to economics. The methodology of economics evolved after Keynes, with the conventional interpretation of Keynes's macroeconomic innovations playing an important part. But the growth of mathematical formalism meant a significant divergence from Keynes's approach. He has often been characterized as rejecting mathematics outright, which, as we have seen, misrepresents Keynes's view that mathematical modeling has a role, but only a partial role, in economic thinking. The very idea of treating the issue in dualistic terms (math or no math) is in fact a further reflection of closed-system thinking (Dow, 1990).

Nevertheless there are currents in modern economics which might draw anew, to great effect, on Keynes's methodology, were it more widely understood and appreciated. The fact that experimental and survey evidence is being taken seriously in discussions about individual rationality, for example, suggests that what were regarded a self-evident axioms of rational individual behavior may now be being thought of as provisional. The very public discussion of the model uncertainty of central banks, as markets attempt to interpret signals of central bank thinking, puts the focus on the limitations of single formal models in providing reliable forecasts. There is the possibility here for a change in the way in which we think about economic problems.

The critical issue, in my view, is how far economics continues to be defined by its (mathematical formalist) method. It is that which will determine whether thinking does change in the way Keynes had advocated, with formal argument being treated as only partial alongside other (incommensurate) forms of argument. There are significant difficulties in incorporating into rationality axioms the type of behavior which these new types of evidence are suggesting, just as it has proved impossible to incorporate model uncertainty, in its true sense, into a modeling framework. Keynes's 'way of thinking' addressed the actual behavior and actual knowledge problems we face in a non-deterministic social system. If these are really to be taken seriously as economics moves

forward, and Keynes's thinking taken on board, then there is still scope for a methodological Keynesian revolution.

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