

WORKING PAPER: COMMENTS WELCOME

PARADIGM-CONSISTENT EXPECTATIONS: POST KEYNESIANISM VS ORTHODOXY

ABSTRACT

This paper advances a concept of paradigm-consistent expectations. Two forms of paradigm-consistent expectations are investigated – a Post Keynesian form based on the *General Theory*, and an orthodox form based on ‘rational expectations’ theory. As used here, a paradigm is an intellectual system with three elements – a core conceptual framework, a set of theories or models, and a methodological position. Expectations that are paradigm-consistent are derived from the paradigm being employed rather than from the model belonging to the paradigm, with methodological considerations playing an important role. The concept is thus broader, and uses more relevant information, than model-consistent expectations. The discussion also assumes that all agents are rational in the senses prescribed by their paradigms. It is argued that the Post Keynesian form of paradigm-consistent expectations offers a superior approach because it is more comprehensive and realistic, and has greater explanatory power in relation to the dysfunctionality and functionality of market economies.

1. Introduction

This paper sets out a theory of paradigm-consistent expectations which differs from theories of model-consistent expectations (‘rational expectations’) and their extensions.

This paper makes three main claims:

- (i) that paradigm-consistent expectations are broader than model-consistent expectations,
- (ii) that paradigm-consistent expectations exist for both Post Keynesianism and orthodoxy, but are vastly different, and
- (iii) that the former is a superior approach on several grounds.

The discussion draws together several large subjects at a fairly high level of generality. As with all such discussions, the key issue is whether the general argument is on the right track rather than the presence of mistakes in particular areas which are almost inevitable in all high altitude surveys.

2. Meanings

By a paradigm, I mean an intellectual system that has three elements:

1. A core conceptual framework, based on foundational ideas, assumptions and relationships.
2. A set of theories or models constructed within this framework, usually employing additional concepts, assumptions and relationships. In the present context, the focus is on expectations formation.
3. A methodological position, including theory construction and the theory-reality relationship.

By paradigm-consistent expectations, I mean that rational agents form expectations (usually of the future) based on, or in concordance with, the nature of the relevant paradigm.¹

By orthodoxy, I mean standard Neoclassical economics combined with ‘rational expectations’ (RE) theory or its extensions. By Post Keynesianism, I mean approaches

grounded in the theoretical framework of Keynes's *General Theory* and extended by subsequent developments and insights that are (broadly) compatible with this framework.

Note that in both approaches, agents are viewed as rational in the following respects:

- (i) they use all the information available to them within the respective paradigm, and
- (ii) they seek to improve their situations, given their objectives, abilities, knowledge and circumstances.

However, wide variations in the treatment of (i) and (ii) by the two approaches mean that there are huge differences in the ways that rationality is conceptualised, portrayed and expressed. In general, the tighter the specifications placed on (i) and (ii), the more closed is the approach and the smaller the set of relevant cases.

3. Theory Construction and Application to Reality

The points made here are elementary but very important. All theories (both formal and discursive) are based on assumptions which simplify the reality being investigated. These assumptions seek to separate out fundamental or primary elements from secondary or peripheral elements. There are, of course, different views as to what is fundamental and what is not – Post Keynesianism regards radical uncertainty as fundamental, whereas orthodox economics does not. But in all cases, the way in which theories are constructed means an inevitable separation of reality into two parts – elements which are included and elements which are excluded. Thus while theories may aspire to be realistic to various degrees, they can never be realistic in any complete or descriptive sense. But it should also be borne in mind that the way in which the included elements are conceptualised and handled may create even *greater* divorces between theory and reality.

The excluded elements that are assumed away, or abstracted from, are still present in reality and are still determinants of what happens. In using theories as explanatory tools or as a basis for policies, the excluded parts need to be brought back into the picture. It is possible that their influence may be large or important and that to neglect them will lead to poor explanations, predictions, or policies. Handling the gap between theory and reality is thus an important issue, especially when the theory in question has highly simplified assumptions.

To methodologically aware people, these facts provide relevant information about economic analysis which ought to be included in the data used in decision-making. In this context, the question arises as to what information should be attributed to theoretical agents in economic models. In orthodox theory, agents are standardly endowed with perfect knowledge of all the factors needed to make determinate choices. In recent years, RE theory has also attributed to them knowledge of true economic models as vehicles for forming the best information-based expectations that agents could have. But if models are deemed to provide relevant information, then surely knowledge of how models are constructed and their necessarily partial grip on reality should also be classed as relevant information which agents should use in expectations formation? If the best-formed expectations use all available relevant information, the data set informing such expectations should then include, *inter alia*, *all relevant methodological information*. While such knowledge is excluded from RE theories for reasons, as we shall see below, are paradigm-consistent, there is every reason to include it in better approaches to expectations formation that accept the tenet that agents should use all available relevant information in expectations formation. Having given agents access to economic models and econometric procedures, there is no reason to prevent access to further information in the form of methodological knowledge.

Such information has several inter-related components. First, models do not present complete pictures of all the factors that need to be considered when dealing with reality. Second, models therefore need to be combined with other kinds of information before making

final decisions. Third, that while more modelling might be of partial assistance, all the required information cannot come from this source for, by definition, formal theories or models are incapable of converting all excluded parts into included parts. No matter how far we make theories more complex by relaxing certain of their assumptions, a gap will always be present. Fourth, since the formal tools of orthodox economics are impotent in the gap between theory and reality, the only course is to switch from formal to non-formal sources of information.² Sources include empirical and historical studies of the behaviour of consumers, firms, industries, markets and economies, the institutions governing economic behaviour, the psychology (individual and group) of decision-making, principal-agent problems, case studies of significant events and the role of economic theory in these events (the GEFC), the history of economics as revelatory of variations in economic discourse and its truths, and the philosophy of science or methodology.³ This knowledge from outside the model can then be used to modify the conclusions generated by the model.

4. Orthodoxy

The three elements of the orthodox paradigm are as follows.

1. The Neoclassical framework

This is grounded on the assumptions of theoretical individualism, maximising agents, perfect knowledge of all information required to find determinate solutions in given contexts, and perfect computational ability. Overall it pursues determinacy and closure, not openness. In relation to the future, the perfect knowledge assumption takes two forms. The ‘certainty form’ assumes indubitable knowledge of all relevant matters, so that expectations become unnecessary. The ‘uncertainty form’ abandons this particular assumption but replaces it with a different form of perfect knowledge. Here the road bifurcates. General equilibrium theory assumes indubitable knowledge of all the possible states of the world, with agents possessing numerical probabilities for all possible outcomes in these states. These subjective probabilities underpin expectations and represent a world of ‘risk’ or probabilistic uncertainty. The other, ‘rational expectations’ approach is discussed in the next section.

2. ‘Rational’ expectations theory

On this view, economic phenomena are caused by a combination of two components – fundamental factors captured by the true economic model, and exogenous stochastic variations which are assumed to be iid $(0, \sigma^2)$. The approach is grounded on perfect knowledge by assuming, first, that such knowledge exists (there is only one true economic model, and the form of stochastic variations is known); second, that *all* agents are in possession of these pieces of information as well as complete knowledge of the operations manual for the model; third, that all agents know that other agents use this model correctly to form expectations of variables and that they base their behaviour on these common expectations. The result is the familiar instantaneous equilibrium in the current period with minimal transition intervals between equilibria. Deviations from forecasts may occur due to the stochastic element, but agents know this and that such deviations average out to zero over time. If mistakes occur, they are thus random and not systematic. Uncertainty is allowed to exist in this approach but it is ‘neutralised’ by rendering it *unsurprising to agents and having no relevance for their mode of behaviour*. In both GE theory and RE theory, a form of uncertainty is allowed to exist, but it is controlled and contained so that it does not destroy determinacy or threaten the hard core of the framework – maximising agents must always be provided with the knowledge and ability required to solve the problems set for them by the theory.

These remarks can be extended with suitable modification to include other approaches based on what may be generally termed *agent-theorist equivalence*. For example, the more recent ‘learning approach’ to modelling expectations formation is based on adaptive learning in

which agents use (i) forecast functions that are revised over time as new information arrives and (ii) econometric techniques to estimate the forecast functions. In the long run, such models typically converge on rational expectations equilibria as the endpoint of the learning dynamics.⁴ The learning approach thus extends the rational expectations treatment of agents as economists with economic models to a treatment in which agents are also econometricians with models of the processes by which data is generated and revised.

3. Methodological position

Orthodoxy is in a state of deep confusion in this area, with several conflicting and unconvincing stories being told at different levels of the subject. At an intellectual level, this is because its framework has limitations so severe that are difficult to defend, and at a practitioner level, it is because mathematical modelling appears more scientific, technical and solvable compared to messy methodological reflection.⁵ The weaknesses of its methodological position are evident from the two main approaches it adopts. Both accept that a theory-reality gap exists, but they diverge in treating it as either (i) unimportant or (ii) irrelevant, although this difference does not really matter because both arrive at the same end result.

The *unimportance* path is implicitly taken but never explicitly discussed. Popular with textbook writers, it amounts to saying that this is an issue that cannot be effectively dealt with so it will be ignored. It may be touched on in a muted way, but thereafter detailed exploration is not pursued. It is too bothersome and undermining, and a distraction from far the more important concerns of technical model-building. Who ever learnt anything from methodology anyway?

The *irrelevance* position is Friedman's (1953) 'as if' hypothesis, which is still often used as a primitive defence. This strategy, which recasts the role of theory, contends that since all assumptions and theories are necessarily unrealistic, the role of theory is not to reveal causality or provide explanation, but simply to generate predictions. Valid theories predict well and invalid ones do not. Pure instrumentalism or pragmatism lies at the heart of the 'as if' position, despite any accompanying hand waving. Although seriously deficient and not consistently adhered to, it is widely used by orthodox economists with little or no interest in methodological questions.⁶

Whether the problem is dealt with by silence or impoverished argument, the message is 'Don't mind the gap' – it is trivial or irrelevant and has no implications for the economic understanding of phenomena. Two further consequences follow:

- (i) theory is presumed to be directly applicable to reality without mediation, and
- (ii) theories may be applied to any subject regardless of their assumptions because assumptions are no longer relevant as conditions of applicability.

This strategy has implications for the information and rationality of agents because methodologically ignorant agents (and economists) are necessarily less well-informed and hence less rational. The RE criticisms that other approaches are inadequate for (a) not using all available information and (b) thereby allowing agents to make systematic errors, now ensnare RE theory itself. For its agents are throwing away much useful information about model-based conclusions, and they are prone to making systematic errors, not only when the assumed stochastic variations do not behave as assumed (which is common in reality), but also because the permanent loss of the *same* kind of information can bias results in one direction more than another. For example, orthodox models are heavily biased towards optimal outcomes because they typically exclude all factors that disturb or prevent such outcomes.

5. The Paradigm Consistency of Orthodoxy

'Rational expectations' are not only model-consistent but also paradigm-consistent. They are based on the (putatively) 'true' economic model which has Neoclassical foundations, and on (putatively) true assumptions about stochastic variation. And since knowledge of methodology provides no relevant knowledge to rational agents, the theory-reality gap is unimportant and these expectations become directly applicable to reality. No loss of relevant information occurs, and it remains true within this paradigm to claim that RE agents are rational because they use all the information available to them and do not make systematic mistakes. Indeed, this approach is obliged to deny that methodological awareness could supply any relevant information to agents, for then one of its key claims would be false. Within its own paradigm, it is thus internally self-justifying – the constructed circle is both complete and tight. The methodological position renders other sources of information and influences irrelevant, thus protecting the RE claim to provide superior expectations using Neoclassical theorising. The model and methodology of the economist (and econometrician) is internalised as the model and methodology of the theoretical agents. Criticism of the edifice must therefore come from other paradigms, particularly those with different methodological understandings.

6. Post Keynesianism

The three elements of the Post Keynesian paradigm are as follows.

1. The Post Keynesian framework

Post Keynesianism is a general theory of which orthodoxy is a special case in at least two senses. The principle of effective demand generates multiple employment equilibria with full employment as a special case. And the theory of agent behaviour in the context of imperfect information and ability allows agents to behave in a wide variety of ways, with the case of perfect knowledge and ability being a special limiting instance. As a result, Post Keynesian explanation is in terms of *both* system and agent behaviour, and not the latter alone. Overall, it represents a more open system compared to the closed system of orthodoxy.

Agents use the information and ability they have to best advantage, but these, in principle, vary across a range of imperfect states depending on context, rather than being limited to the extreme of perfection. Typically, information and ability are taken to be imperfect, with imperfection increasing the longer the future time horizon (as with long term expectations). In these situations, individuals do the best they can, but acting as orthodox maximisers is typically impossible. In addition, being human agents rather than robots, their expectations may also be based on psychology (group or individual) which then influence rational strategies.

2. A (Post) Keynesian rational expectations theory

Agents are rational but their expression of rationality takes different forms depending on circumstances. Two broad cases may be distinguished.

- (a) *Strong rationality* exists when agents either have full knowledge and ability or when probabilities are known and manipulable by agents so that expectations are firmly based in information and ability. Such situations are most likely to be located in the short term.
- (b) *Weak rationality*, on the other hand, exists in conditions of irreducible uncertainty where probabilities are unknown to agents because of a paucity of data and inadequate reasoning power relative to this data. This is highly relevant to decision-making over the long term. In these situations, agents retain their disposition to be rational under impoverished conditions, for why would they abandon their rationality just because circumstances had changed? They

do not become irrational merely because the techniques of strong rationality are inapplicable but, as Keynes liked to put it, 'fall back on' other forms of behaviour that 'save our faces as rational, economic men' (*CW XIV* 114). These other forms he placed under the heading of 'techniques' or 'conventions'. In what follows I will concentrate on the case of weak rationality and expectations under irreducible uncertainty.⁷

Keynes's Techniques/Conventions

The four (occasionally overlapping) suggestions that Keynes outlined in 1936-37 may be summarised as follows, where this summary is my re-worded blending of remarks in the *General Theory* (*GT*) and his 1937 *QJE* paper.⁸

(a) Conditional Projections of the Present into the Future

This technique projects 'the existing situation...into the future', *until* such time as 'we have more or less definite reasons for expecting a change' (*CW VII* 148). We know future change is highly likely but we ignore it when we know nothing about its *actual* character (*CW XIV* 114). However, being rational and knowing we are assuming that 'the present is a much more serviceable guide to the future than a candid examination of past experience would show', we are also cognisant of the precariousness and vulnerability to change of such projections.⁹

(b) Conditional Beliefs that Markets Correctly Incorporate Future Prospects

The *GT* and *QJE* article express this technique in different contexts. The longer discussion in the *GT* occurs in relation to the institution of the *Stock Exchange* and its influence on current investment (*CW VII* 150-53). The daily transactions and valuations on the exchange mean that the 'genuine expectations' and longer time horizons of professional entrepreneurs are often swamped by the 'average expectation' and shorter time horizons of traders. The (re)valuations of the latter are carried out on the assumption that 'the existing state of affairs will continue indefinitely, except in so far as have specific reasons to expect a change', a procedure similar to, but somewhat different from, the first convention.¹⁰ In the *QJE* article, the technique is stated more briefly and generally: '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 and until* something new and relevant comes into the picture' (*CW XIV* 114, emphasis added). However, in either context, rational beings do not 'really believe the existing state of affairs will continue indefinitely', for they 'know from extensive experience that this is most unlikely' (*CW VII* 152).

(c) Behaviour Based on Consideration of Mass Psychology

This convention is presented in two different forms. The brief general comment in the *QJE* article advances the conformist or herding variant:

(i) When uninformed, follow the (hopefully better informed) crowd.

Knowing that our own individual judgment is worthless, we endeavour to fall back on the judgment of the rest of the world which is perhaps better informed. That is, we endeavour to conform with the majority or the average. (*CW XIV* 114)

The *GT* suggests a more forward-looking variant.

(ii) Guess better than the crowd.

In the stock market, both professional investors and speculators are occupied 'not with making superior long term long-term forecasts..., but with foreseeing changes in the conventional basis of valuation a short time ahead of the general public', that is, with 'what the market will value it, under the influence of mass psychology, three months or a year hence'. As a result, the market becomes a game in which transactions are based not on the investor's own best anticipations of the future but on their third degree anticipations of 'what average opinion expects the average opinion to be' (*CW VII* 154-6).

(d). Adherence to Orthodox Economic Theory

This technique is mentioned in the *QJE* paper after the other three have been sketched, and applies to agents who accept orthodox economic thinking for whatever reason. Because orthodox theory is grounded in perfect knowledge in one form or another, it offers one way of dealing with irreducible uncertainty or knowledge deprivation, and that is to assume that it doesn't exist. In Keynes's words, 'classical economic theory [is] itself one of these pretty, polite techniques which tries to deal with the present by abstracting from the fact that we know very little about the future' (*CW XIV* 115).¹¹ In this case, the convention that using orthodox theorising provides *as good a basis as any other for forming expectations* may be employed. Such decision-makers may also adopt the convention of the orthodox view that these expectations apply directly to reality, or they might, with greater methodological awareness, modify these expectations before acting on them.

These four techniques have two characteristics – they engender stability so long as the convention is maintained, but, being precarious and ultimately arbitrary, they generate instability by their vulnerability to sudden changes and switches to new conventions (*CW VII* 153; *XIV* 114-5). Two factors, in particular, promote instability. One is that conventions are known to be based on very slight knowledge which is unreliable over time (the first and second conventions). Agents know that they are on flimsy foundations and that they will have to consider other, equally flimsy foundations when the existing foundations give way at an unknown time. The other vulnerability (relating to the second and third conventions) is that a valuation based on the 'mass psychology of a large number of ignorant individuals is liable to change violently as the result of a sudden fluctuation of opinion' because there are 'no strong roots of conviction to hold it steady'. The market will then be subject to waves of 'optimistic and pessimistic sentiment' (*CW VII* 154). Interestingly, the fourth convention also has stable and unstable tendencies. Among committed orthodox economists, the convention will not tremble since belief in the orthodox framework is rock-solid – not even a global crisis could provoke collapse or significant change among this group. But for the less committed who are willing to learn from experience, the convention might weaken and collapse, leading to a shift from fundamentalist paradigms that shun flimsiness to paradigms that incorporate it.

These are not the only factors involved, however. Apart from convention-based instability, additional instability derives from human nature which drives our actions through 'animal spirits', rather than calculations of expected values using probabilities. Animal spirits themselves are influenced by moods of optimism and pessimism among entrepreneurs. On the other side, there are certain factors that promote stability – long term investment in buildings, public utilities, and public ventures driven by social benefits.

The Rationality of Convention-Based Behaviour

Rational agents in all kinds of roles need to form expectations to make long term plans and policies and, in so doing, seek to do the best they can. Whenever the preconditions for strong rationality are absent (insufficient information and/or insufficient reasoning power), agents still exercise their rationality but in highly deprived environments. This requires the adoption of, or 'retreat to', other strategies for expectations formation, namely, the alternative procedures of weak rationality. What these procedures are is a matter for investigation, but whether they are Keynes's techniques or different ones with similar realistic links to human behaviour, they are defensible as rational under the circumstances. Agents do not suddenly become irrational just because of altered conditions. Changes in circumstances do not destroy rationality but they can, and do, alter the forms in which it is expressed.¹² As Keynes put in summing up his discussion in chapter 12:

We should not conclude from this that everything depends on waves of irrational psychology. ... We are merely reminding ourselves that human decisions affecting the future... cannot depend on strict mathematical expectation, since the basis for such calculations does not exist; and that it is our innate urge to activity which makes the wheels go round, our rational selves choosing between the alternatives as best we are able, calculating where we can, but often falling back for our motive on whim or sentiment or chance. (*CW VII* 162-3)

3. Methodological position

Just as PK theory makes Keynes its departure point, so also does its methodology. However, although Keynes provided no extended discussion of his methodological position, there are numerous remarks in his writings to indicate its overall configuration. In general terms, it is based on the following elements – realism is important, assumptions matter, theory is about explanation and causality, multiple levels of abstraction are required, economics is a guide to thought, the theory-reality gap introduces additional key factors, the world is not analysable by numbers alone, and analysis extends beyond highly abstract theory. The evidence supporting this proposition consists of an accumulation of many instances, of which the following is a brief sample. Post Keynesianism presumably operates with a similar methodology, whether modified or not.

The general methodological stance that underpinned Keynes's thought throughout his life began in his early Cambridge days under the influence of Moore and Marshall, its presence being evident in his philosophical fellowship dissertation and early economics lectures. One key point emerged in the *Treatise on Probability* where, in the context of statistics, he emphasised that inference differed from description in requiring *additional* considerations and modes of analysis.

[Inference] must take account of whatever extraneous knowledge may be available regarding the sample of the population which came under observation, and of the mode and conditions of the observations themselves. Much of this may be of a vague kind, and most of it will be necessarily incapable of exact, numerical or statistical treatment. (*CW VIII* 360)

He also acerbically criticised the application of statistical methods when their assumptions were violated. His 1922 preface to the *Cambridge Economic Handbooks* set out his general view of economic theory.

The theory of economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor draw correct conclusions. (*CW XII* 856) And in his 1924 essay on Marshall, who steeped himself in detailed knowledge of the business world, he declared that the master-economist must 'contemplate the particular in terms of the general, and touch abstract and concrete in the *same* flight of thought (*CW X* 173, emphasis added).

The *GT* contains many methodologically pregnant remarks. It accuses orthodoxy of unrealism in seeking to analyse mass unemployment using a theory that assumes full employment. In discussing long term expectations, he moves easily between levels of abstraction, from *a priori* theorising to the more realistic level of actual behaviour and business psychology, considerations which, he argued, 'should not lie beyond the purview of the economist' (*CW VII* 149, 158). And, after noting 'the extreme complexity of the actual course of events', he observed that in examining actual problems along his lines, 'our *practical intuition* (which can take account of a more detailed complex of facts than can be

treated on general principles)' will gain more traction (*CW VII* 249, emphasis added). Finally, in the *QJE* article, he remarked that 'the theory we devise in the study of how we behave in the market place should not itself submit to market-place idols' (*CW XIV* 115). That is, in constructing economic theory, we should focus on the actual conditions of rational agents and the behaviours they generate, and not solely on unrealistic representations which assume all the information and abilities needed to guarantee well-behaved, self-regulating markets.

To sum up: Keynes's philosophy and economics always regarded methodology as a key concern for analysts in all fields. One needs to have adequate meta-knowledge concerning what one is doing and the tools one deploys. As regards theory and reality, the injunction becomes, 'Do mind the gap, for it needs to be dealt with in a sensible way.'

7. The Paradigm Consistency of Post Keynesianism

In the orthodox paradigm, agents use their perfect knowledge to generate quantitative values for expected variables, and then ground their behaviour directly on these values without further qualification. Expectations are endogenous and unmediated, with orthodox agents being in exactly the same position as orthodox economists.

These outcomes are impossible in the Post Keynesian paradigm. First, agents cannot use the model to generate expected values because several of the factors determining expectations are exogenous and non-numerical. Second, the procedures that agents use to form expectations do not form part of the model but belong to factors outside the model. While agents might use information derived from the model in forming expectations, the procedures used are not grounded on the economic model as they are in orthodoxy. Third, Post Keynesian economists are not in the same position as their agents. In applying models to reality, they can modify the model's conclusions in the light of additional information derived from real world factors outside the model.

Within this framework also, expectations formation is paradigm-consistent. Uncertainty is taken seriously; variable forms of rationality exist; the importance of the theory-reality gap is acknowledged; an openness to multiple, rather than unique, outcomes is evident; and exogeneity is a source of stability and instability. The paradigmatic circle is complete. Radical uncertainty and weak rationality mean long term expectations are exogenous and incapable of being generated by the model itself. And exogeneity creates a larger circle that is open to external factors and more than one level of abstraction.

Finally, two arguments may be advanced as to why RE theory could be considered a special case of Post Keynesianism. The first is the trivial one that RE would be an acceptable theory of an ultra-extreme case when all its assumptions were satisfied. That is, agents have perfect knowledge and computational abilities in the required forms and methodological issues can be ignored. The second is that RE theory could be adopted as a 'technique' for dealing with irreducible uncertainty. This is not to accept it as correct or scientific, but only as a convention for dealing with the unknown future that might be as good as any other stratagem or method.

8. Could PK Models Generate Definitive Agent Expectations?

The world of conventions is very different from the world of independent robots pursuing quantifiable objectives according to fixed (maximising) rules. Nevertheless, the question arises as to whether PK models could imitate RE models in being devices for generating definitive, final expectations for agents.

Various features of the PK paradigm appear to make this impossible. The PK macroeconomic model is essentially grounded on the principle of effective demand set in a context of (variable but significantly irreducible) uncertainty. This context means that certain key variables become exogenous for reasons deriving from the presence of uncertainty and the behaviour it generates. This effectively gives Keynes's discussion in the *General Theory* a bipartite structure. One part is the model itself, the mechanisms of which operate with a set of exogenous variables, and the other part is the justification of the exogeneity of these variables. This separation is detectable in the *General Theory*, although it is not explicitly mentioned as such. Chapter 12, which deals with the impact of irreducible uncertainty, refers to the discussion of conventions or techniques as a 'digression' (CW VII 149), that is, a digression made to explain some key features of the model. Later, in the summary of the theory (chapter 18), it is twice noted that the *independent* variables include 'the schedule of the marginal efficiency of capital' or 'the psychological expectation of future yield from capital assets', with these 'capable of further analysis' (CW VII 245-7). And the *QJE* paper reflects the digression idea by referring to the remarks on conventions as a 'general philosophical disquisition' on human behaviour, which may appear remote from economics but is required in any realistic economic analysis (CW XIV 115).

Three further arguments also support the claim that models based on the approach of the *General Theory* cannot generate agent expectations in the manner of RE theory. First, the former does not provide agents with a tool or algorithm for calculating definitive, numerical expected values to be used in final decision-making. What it does provide, and rightly so according to Keynes, is a guide to thought, not a machine for cranking out correct numbers. Second, the methodologically aware person (economist or agent) will know that whatever numbers are cranked out by a model cannot be considered as final numbers representing best expectations, but as numbers to be modified using all the other relevant information excluded from the model.

Third, it seems impossible to incorporate or endogenise Keynes's techniques or conventions into a quantitative model. Consider, for example, the first convention which has a simple logical structure that could be modelled as follows.

Let X be the view that 'the present situation will continue', and Y a different view. Agents base behaviour on X until they have good reasons not to use X, at which point they shift to Y.

Can such a situation be captured by a mathematical model? On the basis of standard formal procedures, I am inclined to think not for the following reasons.¹³

- (i) In general terms, the problem is *non-quantitative* in nature, cardinally and ordinally.
- (ii) It is based on a *conditional acceptance*, not a fixed rule for all circumstances – that is, 'use X until...', rather than 'always use X'. Conditional acceptance relies on judgment, not robotic behaviour.
- (iii) Specifying the shift from X to Y is problematic on several grounds – what triggers it; when are reasons good enough; is Y a new form or a revision of X; if Y is new, what determines it?
- (iv) Conventions are shared by all or most agents, and hence are group phenomena susceptible to influence from institutions and mass psychology which do not yield easily to formal analysis.

The other conventions present similar or greater challenges.

In sum, the separation of the causal mechanisms of the model from the way agents form expectations, along with agent methodological awareness and the difficulties of formalising techniques and conventions, means that expectations formation cannot be endogenised into

PK models in the manner of RE theory, namely, by having agents use the economists' model to form their expectations.

9. Superiority of PK Paradigm-Consistent Expectations

Paradigm-consistent expectations are a significant improvement on model-consistent expectations because they provide agents with a broader base of relevant information. They give agents access, not just to economic models and econometric techniques, but to other sources of important knowledge, including methodological knowledge about the construction, nature and applicability of models and techniques, and real-world information about how agents, markets and systems behave in practice.

In addition, the Post Keynesian form of paradigm-consistent expectations is superior for a variety of reasons – it regards (irreducible) uncertainty as an inescapable fact of economic life, it takes methodology seriously, it is more comprehensive by embracing more of the information sources available to agents, it is more general in covering a range of cases that includes orthodoxy as a special instance, and it can explain both dysfunctionality and functionality in both financial and non-financial market systems. In particular, it is highly relevant to the current global financial and economic crisis, with a number of passages in the *GT* being directly applicable to recent events even though they were written over 70 years ago.

10. Conclusion

A theory of paradigm-consistent expectations that is more general than model-consistent expectations has been outlined. By providing agents with access to important methodology-based information, the former provides agents with a larger data set for expectations formation. Two forms of paradigm-consistent expectations were then compared and contrasted – a Post Keynesian form based on the *General Theory* and an orthodox form based on 'rational' expectations theory – with the former being viewed as an improvement over the latter on the grounds of greater generality, comprehensiveness and explanatory power.

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NOTE: FURTHER REFERENCE TO BE ADDED AND INCORPORATED LATER

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ENDNOTES

¹ The possibility that a theorist might assume that agent behaviour in his or her model conforms to his or her paradigm should come as no surprise.

² This is one reason why orthodox theory, being so preoccupied with formalism, treats the gap as unimportant or irrelevant (see below).

³ Much of this material used to be standard in economics syllabi, but it has now been discarded under the influence of (American) Neoclassicism which sees the trade-off cost of these topics in terms of lost opportunities for more model building as enormously high.

⁴ See Evans and Honkapohja (2001), for example)

⁵ This is a key reason why courses on methodology have been replaced by yet more technique-based courses.

⁶ An example is its use in justifying the extensive use of the empirically impossible perfect competition model to explain real markets.

⁷ This distinction dates back at least to 1979 in relation to Keynes. For extended discussions, see Author (1989) and (1991).

⁸ Not all of the techniques may be relevant for the changed conditions of the 21st century, but as a whole they still have considerable importance.

⁹ Quotations in this paragraph are from *CW VII* 148 and *XIV* 114. A behavioural economist might prefer to characterise this convention as ‘Information Bias towards the Better Known’, because it is ‘foolish, in forming our expectations, to attach great weight to matters which are very uncertain’, and it is ‘reasonable...to be guided to a considerable degree by the facts about which we feel somewhat confident’. Hence we ‘largely ignore the prospect of future changes about the actual character of which we know nothing’ (*CW VII* 148, *XIV* 114).

¹⁰ The difference concerns the explicit summing up of future prospects of an investment.

¹¹ This technique is exploited below in making RE a special case of Post Keynesian expectations.

¹² There is a common but knee-jerk reaction from those influenced by the Neoclassical conception of rationality to think that behaviour not conforming to that conception is *ipso facto* irrational. A recent example of this jejune response from economists who should know better is Akerlof and Shiller (2009).

¹³ I recognise the possibility of new future procedures that are adequate to the task.