Are conventions solutions? Contrasting visions of the relationship between convention and uncertainty.

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In recent years there has been a significant increase in economic research on social conventions motivated by the work of economists such as H. Peyton Young (1996, 1998a) and Robert Sugden (1986) who build on the early contributions of the philosopher David Lewis (1969). Prior to this surge in interest, discussions of convention in economics had been tied to the analysis of John Maynard Keynes's economic and philosophical writings. More specifically, convention had been studied almost exclusively by 'radical Keynesian' economists'[1], building principally on the *Treatise on Probability* (1921), Chapter 12 of the *General Theory* (1936), and Keynes's *Quarterly Journal of Economics* article (1937). These two literatures are distinct and have very little overlap: game-theorists make sparse references to Keynes if any at all.

Yet, this confluence of interests raises some interesting methodological questions. Does the use of a common term such as convention denote a genuine set of shared concerns? Can we identify anything that differentiates the mainstream game theoretic models from the heterodox Keynesian accounts? This article maps out the three most developed accounts of convention within economics and discusses their relations with each other in an attempt to provide an answer.

Some preliminary conceptual clarification is essential before we can develop our argument. Given the relative novelty of the economic study of conventions, it is perhaps no surprise that there is no 'standard' definition of the concept. Fortunately, at least four general features of convention appear to be widely accepted by economists and give a certain coherence to the existing literature:

[1] We use this terminology for convenience in order to refer to the Post-Keynesian school and the Economie des Conventions, both of which draw their inspiration from Keynes's *General Theory*, and neither of which endorses the mainstream interpretation of Keynes's work.

1. Conventions involve coordination between agents
2. Conventions involve regularities in behaviour
3. Conventions are arbitrary
4. *Conventions are responses to uncertainty*

There is little dispute about the significance of features 1-3. It can safely be assumed that most economists understand roughly the same thing when they speak of regularities in behaviour and coordination. The idea that conventions are arbitrary can also be stated in uncontroversial terms: conventional coordination is peculiar in the sense that – for every actual conventional practice – one or more equally desirable alternatives could have been adopted. Uncertainty, on the other hand, has been interpreted in different ways and has been the locus of fierce debate between the heterodoxy and the mainstream since the early 20th century (Knight 1921).

We contend that the controversy surrounding uncertainty is the key to understanding recent discussions of convention since the Keynesian conception of uncertainty is essential for the explication of the split between heterodox and mainstream theories. We will show that, despite significant developments in game theory, the mainstream account of convention remains committed to conceptualising conventions as solutions to the problem of uncertainty. Their role is to facilitate coordination by reducing players' perceptions of the risk of default or cheating. In this framework, uncertainty is understood in probabilistic terms. However, developments in the study of uncertainty within post-Keynesian economics have made explicit Keynes's conception of 'true uncertainty' in terms that distance post-Keynesians from the mainstream view of uncertainty as risk. In a parallel development, another radical Keynesian school of thought – the économie des conventions – has investigated how true uncertainty transforms social practices. Its institutional focus has challenged the mainstream view of conventions as solutions, adopted in order to 'reduce' uncertainty and stabilise individual expectations.

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We conclude our paper by reflecting on what these contrasting approaches to convention reveal about the state of pluralism in economics and the distinctions between heterodox and mainstream approaches.

Part I

The game theory of conventions

Game theory appears to support the case for the renewed openness of mainstream economics towards the study of social phenomena that were once ignored by the discipline. At the same time, game theory's language and proximity with mathematics have helped to establish it within economics. It has often been deployed at the frontier of traditional theory to study the paradoxes of rationality, equitable allocations and reciprocal and tit-for-tat strategies. Thus it is no surprise that game theorists have been amongst the first economists to apply economic modes of reasoning to the study of new phenomena.

A central problem of economics concerns how the multiple and decentralised actions of economic agents can come to coordinate at a unique equilibrium and game theorists suggested a way out: they began to investigate how they might use convention as a solution concept. With the introduction of convention, game theory introduced a foreign idea into its standard formal framework, a nomadic concept that represents common forms of social behaviour as non-reflective (that is to say not based on sophisticated rational expectations). This is how Sugden (1986, p. 32) introduces the concept of convention before going on to define it more strictly in terms of an equilibrium in a game.

> Consider what we mean when we say that some practice is a convention among some group of people. When we say this, we usually mean that everyone, or almost everyone, in the group follows the practice. But we mean more than this. Everyone eats and sleeps, but these are not conventions. When we say that a practice is a convention, we imply that at least part of the answer to the question 'Why does everyone do X ?' is 'Because everyone else does X'. We also imply that things might have been otherwise : everyone does X because everyone else does X, but it might have been the case that everyone did Y because everyone else did Y. If asked 'Why does everyone do X and not Y ?', we may find it hard to give any answer at all. Why do British drivers drive on the left rather than the right ? No doubt there is some historical reason why this practice grew up, but most British drivers neither know nor care what it is. It seems sufficient to say that this is the established convention. I shall define a convention as : any stable equilibrium in a game that has two or more stable equilibria. (Sugden 1986, p. 32)

Sugden's strict definition is shared by all game theoretic models of convention. By definition, a convention is an equilibrium in a co-ordination game – that is to say a game with multiple equilibria – and to follow a convention is a social process of equilibrium selection. *A convention is a solution.* The relevance of convention to economics is directly attributable to its beneficial consequences (as a stable equilibrium) as it permits successful co-ordination where co-ordination might not have been possible due to the existence of multiple equilibria. Young (1998b) follows exactly the same logic: convention is introduced by the theorist because of its desirable economic consequences for the actors.

> To capture the social dimension of convention, we could say that a convention is equilibrium behavior in a game played repeatedly by many different individuals in society, where the behaviors are widely know to be customary. […] What, though, is the relationship between social convention and economic welfare ? At one level the answer is simple enough : conventions reduce transaction costs by coordinating expectations and reducing uncertainty. (Young 1998b, p. 823)

This second definition is more specific. The game must be repeated within a given population of players in order to reproduce the necessary behavioural regularity: it marks out Young's approach as evolutionary game theory. Moreover, Young redescribes the problem of equilibrium selection as a problem of choice under 'uncertainty' and provides an economic raison d'être for conventions as an aide to co-ordination under uncertainty.

A review of the different types of games proposed by game theorists of convention serves to illustrate how models place varying emphasis on uncertainty. Consider the class of co-ordination games where two players have the same two strategies and where payoffs are such that there are multiple, pure Nash equilibira. Depending on the value of the payoffs, the equilibria vary and the properties of *payoff dominance* and *risk dominance* of these equilibria also vary (Harsanyi and Selten 1988). Thus the diversity of equilibria and their properties determine the degree of uncertainty in co-ordination.

The rendezvous, stag hunt, driving, telephone, crossroads and hawk-dove games are six different types of co-ordination game, each with two Nash equilibria. In the first three types of game the players must choose the same strategy (in the rendezvous game they must go to the same place to meet; in the stag hunt they must

hunt the same prey; in the driving game they must drive on the same side of the road). In the other three games, the players must choose opposing but complementary strategies (in the telephone game one must call back whilst the other waits; in the crossroads game one slows down and the other maintains speed; in the hawk-dove game one plays hawk the other plays dove). There is no sense in which there is a 'better' strategy that can be systematically adopted by one player: in each of these games, the players choices are interdependent. It is the absence of such a strategy, due to the multiplicity of equilibria, that creates what game theorists such as Young have called uncertainty.

The rendezvous and stag hunt games are co-ordination games where the equilibria are payoff and risk dominant. In these games uncertainty boils down to the well-known problem of co-ordination failure (Cooper and John 1988): players can co-ordinate at a sub-optimal equilibrium if they are not sensitive to the property of payoff-dominance of one of the two equilibria. They can only follow the established convention. Coordination is assured at the cost of efficiency. In the stag hunt the risk of co-ordination failure is higher because the payoff dominated equilibrium is risk dominant. This means that once there is a doubt about the other player's move, the strategy of hunting hares becomes the less risky option even though the stag is more nutritious if caught (i.e. it provides a higher payoff). In this case the convention stabilises a behaviour that is globally inefficient though less susceptible to non co-ordinated outcomes.[2]

In the other four games, properties of payoff and risk dominance cannot be used in equilibrium selection, hence there is heightened uncertainty. In fact, the driving and telephone games are of pivotal importance as they are the only pure co-ordination games where the players are completely indifferent between strategies. These games are crucial to the game theoretic literature on convention because they bring out the arbitrariness of convention. On the other hand, in the crossroads and hawk-dove games the players are faced with Stackelberg equilibria which present conflicts of interest between them: each player has a preference for a particular equilibrium. The hawk-dove game is the most conflictual of the two in that the dove

[2] For a more recent example, consider the following situation discussed by Goyal and Janssen, where the convention concerns the choice of a network technology. An inferior technology β can drive out a superior technology α if β communicates better with α than α does with β (Goyal and Janssen 1997).

player has a strict preference for the other player to play dove as well. In this context the convention no longer resolves pure uncertainty, rather it resolves a situation of conflict by stabilising an order of priority between the players.

In all these cases the convention provides a solution that allows agents to avoid further layers of higher order calculations and expectations. Individuals who co-ordinate by following a convention do not submit to a particular law or prescription, nor have they signed a contract. The convention is a pre-established solution, an existing regularity that is of an entirely different nature to a law or a contract. The role of the convention is to select an equilibrium amongst several, because whilst agents have the capacity to calculate the equilibria, they fail to co-ordinate on one of them (Rabin 1994).

David Lewis, the pioneer of the game theory of conventions, is the only author who claims to reconcile rationality and convention. His research proposed to develop a response to the language paradox articulated by his mentor, Willard Quine[3]. His aim was to show that rational agents would follow conventions and that they could do so without agreement, purely on the basis of precedent (Lewis 1969, pp. 35-42). But there is a logical incompatibility between the rationality postulate as formulated by mainstream economics and the idea that agents might follow precedent. Economic rationality has difficulty accounting for the type of salience (Gilbert 1990; Miller 1990; Janssen 1998) that is essential to Lewis's account of convention because it is exclusively forward-looking : a strategy is rational at time *t* if and only if it maximises expected utility from *t* into the indefinite future. Precedent could, of course, allow agents to co-ordinate their expectations, but once the rationality of agents is common knowledge in a given population, expectations will be based on the canons of rationality rather than the reproduction of past behaviour. All equilibria – not just the incumbent one – are consistent with rational behaviour under these conditions, so economic rationality and convention cannot co-exist.

This diagnosis explains the fact that within mainstream economics the concept of convention has been developed in evolutionary game theory (Young 1993) rather than the classical game form that Lewis first suggested. In evolutionary game theory agents are backward-looking, so that they base their present decisions only on the observation of past regularities. Not only are they backward looking, but they are also

[3] The paradox was this : do we need language to agree on the meaning of words (the basic conventions of language) in order to create a language ?

naïve: period after period agents choose their strategies reacting purely to the past states of the system and thus only unintentionally contributing to its evolution (Mailath 1998). The agents of evolutionary game theory have bounded rationality: they follow precedent blindly, unaware of alternative courses of action. The spontaneous order achieved is the product of this limitation imposed on their cognitive capacities, it is not planned or premeditated (Sugden 1989).

Nevertheless, evolutionary game theory retains a form of bounded rationality that remains calculative. Its major innovation is to limit the data upon which these calculations are based to information from past periods whilst excluding all knowledge of the future. The decision rules applied by players in evolutionary games fundamentally rely on expected utility calculations that are conditional on the prior states of the system. In this case, the 'uncertainty' surrounding equilibrium choice is resolved through the calculation of a weighted average of past behaviours in the population. Thus the limited rationality postulated by evolutionary game theorists does not expose agents to genuine uncertainty. Instead, adaptive behaviours are propagated through the population in response to individual interactions in an environment characterised by probabilistic risk.

This construction is formalised as a dynamic system (Kandori, Mailath and Rob 1993). The modeller can then predict which out of a number of alternative behavioural regularities will emerge as the dominant one in a given population. Deviant behaviour is possible within this framework: a random noise variable means that individual agents can 'mutate' and adopt any alternative equilibrium strategy. However, the system as a whole converges on a unique convention in the long run. In this way, evolutionary game theory explains the emergence of convention without relying on individual strategic behaviour or standard models of economic rationality. The historical emergence of a behavioural regularity is described in terms of a self-organising ergodic system whose dynamics are both independent of historical contingency and perfectly predictable (Young 1993).

Game theory introduces conventions as solution concepts in an attempt to construct a stable social order in an uncertain environment populated by agents with bounded rationality. Superficially, this appears to distance the game theorists from mainstream accounts of social order. However their in-depth analysis of the properties of stochastic dynamics is very much in keeping with the modelling focus of mainstream theory. Moreover, their attachment to the mathematical tools of modern

economics has two important consequences for their approach: i) convention cannot be understood independently of its status as a solution; ii) the calculative rationality of the agents transforms uncertainty into a probabilistic choice between perfectly known alternatives (i.e. the multiple equilibria of the game).

Part II

Uncertainty and convention in post-Keynesian economics

In recent years, post-Keynesian accounts of radical uncertainty have been supplemented by an extensive literature on the philosophical preconceptions of Keynes's thought, encompassing contributions to the history of thought, philosophy and methodology. This literature draws mainly on the *Treatise on Probability* as well as Keynes's later economic writings. Whilst concentrating on the theoretical and policy implications of the rejection of the standard probability calculus, post-Keynesians have continued to stress the role of conventions in an economy characterised by radical uncertainty.

As noted in Part I, both mainstream and heterodox approaches to convention recognise the relationship between convention and uncertainty. We have already seen that, in the case of game theory, probabilistic accounts of uncertainty are standard. Our contention is that the refinement of the concept of uncertainty undertaken by post-Keynesians provides a non-probabilistic alternative that underpins a contrasting heterodox approach to convention. As we shall see, this alternative framework prepares the ground for another radical break with the economic orthodoxy: it challenges the very idea of conventions as solutions.

In Keynes's economic works, the concept of uncertainty is introduced as he grapples with the question of how we can know anything about the future (Keynes 1936, p. 149). The latter question is a crucial element of his discussion of investment, which refers to examples such as the ten-year yield of a railway, the value of a copper mine, or the goodwill of a patent medicine, to show that the grounds for reasonable estimates of returns are either flimsy or absent. He goes on to describe how the transition from an 'entrepreneurial' economy to a 'speculative' economy can exacerbate this problem. The division of management and ownership, as well as the

speed and frequency of transactions, threatens the stability of the economic system[4]. Speculative decisions, based on 'the news' have a destabilising effect on the level of current investment; they increase the likelihood of market fluctuations and make forecasting pointless.

Keynes developed this theme in his critique of Marshall, Edgeworth and Pigou (Keynes 1937). These classical economists used mathematically calculable probabilities to describe the likelihood of past, present and future events in exactly the same manner. Consequently, what Keynes calls uncertainty was replaced by actuarial risk:

> The calculus of probability, though mention of it was kept in the background, was supposed to be capable of reducing uncertainty to the same calculable status as that of certainty itself; just as the Benthamite calculus of pains and pleasures or of advantage and disadvantage... (Keynes 1937, pp. 112-113)

In his earlier career Keynes had brought the philosophical study of probability into the foreground and realised that probabilities were mathematically tractable only under certain highly restrictive conditions (Keynes 1921). He concluded that a new conception of uncertainty was required to compliment his critique of the classics.

Building on Keynes' remarks, post-Keynesians have discussed uncertainty since the 1960s. The concept is now widely acknowledged to be a fundamental distinguishing characteristic of the post-Keynesian school (Arestis 1996, pp. 117-118; King 2002, p 185). Since post-Keynesian surveys such as those of Arestis (1996) and King (2002) provide comprehensive surveys of the field, we shall restrict our discussion to two pioneering economists who have contributed to shaping the post-Keynesian discussion of radical uncertainty: George Shackle and Paul Davidson.

Shackle was the originator of the 'radical subjectivist' approach to uncertainty (1955, 1972, p. 155-229). He claimed that agents cannot possess *any* knowledge' about the future because it is non-existent and indeterminate.

> The deliberate self-deception of business, in supposing its investment decisions to be founded on knowledge and to be rationally justifiable; the

[4] 'It is as though a farmer, having tapped his barometer after breakfast, could decide to remove his capital from the farming business between 10 and 11 in the morning and reconsider whether he should return to it later in the week.' (Keynes 1936, p. 151)

> insecurity of its faith in its own judgements, which the awareness of this self-deception engenders; the paralysis of decision and enterprise which can result when the structure of pretended knowledge is violently overthrown by events; this central core of the *General Theory* is to be found in Chapter 12... (Shackle 1967, p. 132)

As a result, Shacklean agents do not possess probabilistic estimates about future states of the world. Instead, when faced with a decision, they use their imaginations to construct possible alternatives: they create rather than discover. In this framework agents are aware that their predictions are conjectures and that their plans are susceptible to the imagination of other independent agents; they are conscious of uncertainty. Moreover, their forecasts are affected by their desires (leading to optimism) and their fears can lead them to ignore crucial elements of their situations. Though he was a crucial forerunner of the post-Keynesian work on radical uncertainty, Shackle was never closely affiliated to the post-Keynesian community and worked mostly on his own. This meant that, despite his groundbreaking contribution, he had relatively little direct influence on the development of post-Keynesian research (King 2002, p 187).

Davidson, on the other hand, is a central figure who has been responsible for stimulating much of the subsequent post-Keynesian discussion of uncertainty. He began with a critique of classical and neoclassical economics. Both assume a long run equilibrium that is independent of initial conditions (the ergodic hypothesis that we also found in the evolutionary game theory of Young). The ergodic hypothesis serves to rule out path dependent processes by assuming that they have no effect on the eventual stable state of the economic system. This effectively makes contingent events – and consequently history – analytically irrelevant to economics (Davidson 1982-83). In contrast post-Keynesians such as Shackle are committed to the non-ergodicity of economic systems[5]. In emphasising the impossibility of prediction and the creative aspects of choice, post-Keynesians explicitly deny a crucial assumption of mainstream economics: that past probabilities can provide us with grounds for predictions of future events (Davidson 1991, p. 130). The existence of non-ergodic processes is therefore identified with the existence of 'true uncertainty' and the abandonment of the probability calculus:

[5] According to Davidson this is one of three characteristics that distinguish post-Keynesian economics from the mainstream. The other two are the non-neutrality of money and the lack of gross substitutability between money and other goods.

> ... [in cases of true uncertainty] the economic agent believes that during the time between the moment of choice and the payoff, unforeseeable changes will occur. The decision maker believes that *no* information regarding future prospects exists today and therefore the future is not calculable. (Davidson 1991, p; 131)

These two important figures within the post-Keynesian literature on uncertainty were supplemented by the secondary literature on Keynes's philosophy that grew out of the compilation of Keynes's collected works in the 1980s (King 2002, p 181-182). The work of Lawson (1985, 1988), Carabelli (1988), Fitzgibbons (1988), O'Donnell (1989) and Runde (1990) departed from standard post-Keynesian approaches by emphasising the relationship between Keynes's early philosophical and later economic writings. This literature focussed on the re-reading of Keynes's *Treatise on Probability* (1921) and a number of unpublished student papers by Keynes that had recently been discovered in the Marshall Library in Cambridge.

In the *Treatise on Probability*, Keynes conceives of probability as a logical relation holding between pairs of propositions. Every argument proceeding from a set of premises *h* to a conclusion *a*, is dependent on a logical relation represented as *a* / *h*. This relation is rarely one of certainty and entailment. More frequently it expresses a degree of rational belief or partial inference. Keynes distinguished this position from contemporary mathematical treatments in his discussion of measurability in Chapter 3. Here, he differentiated cases where probability is said to be 'unknown' and cases where probabilities are non-existent or 'indeterminate'. There are many cases in which agents cannot attach an ordinal measure to the relation that holds between given hypotheses and the evidence supporting them[6]. Thus, in Keynes's theory, all probability relations lie on a continuum stretching between absolute certainty and impossibility. Indeterminate cases that are characterised by the lack of both cardinal and ordinal measurability cannot be situated anywhere on that continuum. Lawson (1985) characterises these cases as 'uncertain', and in so doing, he provides a

[6] 'By saying that not all probabilities are measurable, I mean that it is not possible to say of every pair of conclusions, about which we have some knowledge, that the degree of our rational belief in one bears any numerical relation to the degree of our rational belief in the other; and by saying that not all probabilities are comparable in respect of more or less, I mean that it is not always possible to say that the degree of our rational belief in one conclusion is either equal to greater than, or less than the degree of our belief in another.' (Keynes 1921, p. 37)

framework for distinguishing the special nature of Keynesian uncertainty. When a secondary proposition is known and links *a* (the primary proposition) to *h* (the available evidence) with a numerical probability of less than one, or an ordinal probability that allows it to be situated in an ordered series of relations, there is no uncertainty. Thus, uncertainty-as-probabilistic-risk is a non-starter in the framework of Keynes's *Treatise*. True uncertainty only arises when the knowledge of the secondary proposition linking *a* to *h* is absent[7].

The convergence of the post-Keynesian literature on uncertainty around the concepts of non-ergodicity and indeterminacy has stabilised into a consensus since the debates of the late 1980s and, though some terminological differences persist, the distinction between probabilistic calculation and uncertainty is now well entrenched. Post-Keynesians also concur with our conclusion of Part I, that radical uncertainty is absent from traditional economics. As we saw earlier, game theorists conceptualise conventions as solutions to co-ordination problems that are repeatedly faced by rational or boundedly rational agents (Goyal and Janssen 1996), the purpose of these conventions is to eliminate uncertainty and achieve stability.

Moreover, Keynes's account of how people act in situations of uncertainty is also couched in terms of convention. According to Keynes, in the absence of determinate and calculable knowledge concerning the results of all possible actions, conventions form the basis of knowledge under uncertainty. Keynes's discussion of convention is brief, but none of what he says suggests a conception of conventions as solutions.

Instead of providing a general definition of convention, Keynes offers a number of illustrations. The 1937 *QJE* article, a central reference for post-Keynesians, gives the most extensive account of the range of conventions that can be found in financial markets. He delineates three principal types:

> (1) We assume that 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

[7] Uncertainty is also associated to the Keynesian concept of the 'weight of arguments'. We shall not develop this idea in the present article, but refer the reader to Runde (1990) for further details.

> future prospects, so that we can accept it as such unless and until something new and relevant comes into the picture.
> (3) 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 behaviour of the majority on 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* judgment. (Keynes 1937, p. 114)

Some commentators have suggested that these three examples are perhaps best understood as Keynes's account of the *resources* used by investors trying to cope with the overwhelming uncertainty of volatile financial markets (Bibow, Lewis and Runde 2003). What is crucial for our argument however, is that the conventions outlined in the *QJE* article cannot either eliminate or reduce uncertainty. According to Keynes, even if behaviour informed by these conventions happened to stabilise a particular market, the result would be entirely contingent and none of the agents could have rationally expected it to happen. This is underlined by his continuous reference to the influence and unpredictability of the news, which need not track or describe actual events accurately.

Post-Keynesians have long pondered the implications of these passages for economics, but few have tried to work out what Keynes was trying to pick out with the introduction of the concept of convention. What do the three aforementioned examples have in common? Keynes never offered an account of what a convention is, and why and how it might tie these cases together. Post-Keynesians have mostly remained faithful to Keynes by following his description of market conventions but refraining from adding a substantial theory of convention to it. As we have already seen, they have concentrated on the analysis of uncertainty. Some, of course, have ventured tentative elaborations, but these do not go much beyond citations of Lewis (1969) and brief references to 'structures of interdependent expectations' (Davis 1994, pp. 171-176); or 'structures of interdependent judgments' (Davis 1997, p. 210 and the concept remains relatively under-researched within the post-Keynesian tradition.

Another heterodox school in economics has taken up the challenge of analysing conventions: the économie des conventions (EC). Inspired by the same interpretation of Keynes's work as the post-Keynesians, this French research programme uses convention to inform an alternative form of economic analysis. In

the work of the EC conventions can no longer be viewed functionally (as the solutions to problems of choice under uncertainty); rather than eliminating uncertainty, they transform it.

Part III

The economics of conventions: a further step in the Keynesian argument?

The economics of conventions (EC) is a reformulation of the radical Keynesian project that aims to draw out the consequences of a realistic account of uncertainty for economic analysis (Favereau 1985, 1988, 2005, 2008). The starting point of the EC project is the recognition that there are a variety of forms of evaluation and action. Radical uncertainty is one consequence of this variety. One of the principle aims of the EC is to show that competing (and antagonistic) accounts of co-ordination from economics and sociology, can be integrated into a more general framework of co-ordination using a new set of analytical tools. The concept of "convention" is central to this framework, since each of these accounts of coordination may be redescribed as a convention. Conventionalists depart from the game theoretic tradition and redefine convention as a range of consistent interpretations and practices that agents assume to be shared (to some degree) by the other participants in the interaction.

In discussing the EC's approach to convention we prefer to invoke practices rather than "behavioural regularities" that have been emphasised in the first two parts of this paper. In a radical break from mainstream economics, conventionalist analyses have emphasised the interpretative capacity of individuals. The traditional emphasis on behavioural regularities was introduced by Lewis precisely in order to circumvent this interpretative level: consistency in observed behaviour is all that is required for coordination[8]. In contrast, conventionalists claim that the similarity judgments allowing varying degrees of reflexive control are crucial to coordination. These judgments are, in turn, dependent on the agents' representations of the group or community they belong to. Such acts of interpretation allow individuals to identify

[8] At least this is the standard interpretation of Lewis's position based on his first definition of convention. Favereau (2008) shows that in a second version, formulated shortly afterwards in 1971, Lewis came to include representations in his account.

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appropriate conventional actions that are irreducible to any specific behaviour pattern. These interpretations and practices that agents assume to be shared reduce uncertainty without neutralising it completely: the supposition that a convention is in fact in place is reinforced by successful coordination, but never guaranteed.

Coordination can however, be further supported through external qualified objects and mechanisms endowed by *form-giving operations*. The notion of investments of form (Thévenot 1984; Eymard-Duvernay and Thévenot 1985) is used to make sense of the totality of these operations of form-giving. Investments of form produce equivalence across time and space through the existence of objects that can consolidate social relations and thus make them less dependent on the perceptions of the people that create them. The notion of investments of form provides a theoretical analysis of the real cost of moving from an indeterminate thing associated to a simple behavioural regularity to a qualified object associated to a formalised rule. Labels of quality provide an excellent illustration of the process. Once established, they create an equivalence class linking previously diverse objects in an attempt to draw attention to manufacturing standards as opposed to other indicators of quality such as personal recommendations or brand loyalty.

Conventions, insofar as they involve representations of a collective, are bound up with normative judgments about the correct or acceptable functioning of the collective. Exploring this normative dimension of coordination, Boltanski and Thévenot (2006) showed that different conceptions of justice, each relying on its own conception of the common good, can be associated to the most general forms of observed coordination. Consequently, the EC develops and defends six generalisable conventions (or "orders of worth"). Each of these corresponds to a specific form of coordination and a specific conception of worth. Market transactions are placed in the context of a plurality of possible forms of agreement rather than holding the privileged position they do in mainstream economics. For a concise presentation of the orders of worth see Boltanski and Thévenot (1999), from which the following table is drawn[9]:

[9] A more detailed account can be found in Boltanski and Thévenot (2006).

Orders of worth	*Mode of evaluation (worth)*	*Format of relevant information*	*Elementary relation*	*Human qualification*
Inspired	Grace, nonconformity, creativeness	Emotional	Passion	Creativity, ingenuity
Domestic	Esteem, reputation	Oral, exemplary, anecdotal	Trust	Authority
Civic	Collective interest	Formal, official	Solidarity	Equality
Opinion	Renown	Semiotic	Recognition	Celebrity
Market	Price	Monetary	Exchange	Desire, purchasing, power
Industrial	Productivity, efficiency	Measurable: criteria, statistics	Functional link	Professional competency, expertise

In practice, these six main constitutive conventions (or orders of worth) and their attendant forms of coordination tend to get mixed and combined with each other. But they are also mixed with small-scale, local conventions that are less transposable to other contexts. That is why, in addition to the first plurality of orders of worth, there is a second type of diversity in the forms of coordination discussed by the EC: a distinction between different "regimes of engagement" (Eymard-Duvernay, Favereau, Orléan, Salais and Thévenot 2005). Regimes of engagement rank interactions according to the extent to which they can be extended to different people and situations ranging from no possible extension to universal generalization (the orders of worth).[10]

This brief presentation of the concept of convention as understood within the EC tradition will allow us to return to our argument where we left off at the end of Part II. It is now a matter of showing how the dynamics of this reformulated notion of convention rely on the transformation of uncertainty[11].

According to the EC, a convention can be distinguished from a subjective representation because it is hypothetically shared and this 'sharedness' is subject to a test. Tests serve, amongst other things, to introduce a dynamic element to the study of conventions. Conventionalists speak more generally of a test when an action and its consequences serve to establish or discredit a particular collective representation and

[10] For a concise presentation of the regimes of engagement, see Thévenot (2000).
[11] For a presentation of these dynamics that focuses directly on the normative dimension of convention see Boltanski and Chiapello (2007).

its associated hypotheses: the existence of a convention is verified by the success or failure of coordination. Success can be evaluated in a number of different ways ranging from the presence or absence of behavioural adjustments to the achievement of external quantifiable goals through the use of objective indicators. In this last case for example, the test would normally be achieved through the use of an external device.

Thus, coordination can be a continuous process of testing. However, what agents count as tests also depends on the convention insofar as it determines their perception of uncertainty. In other words, the definition of uncertainty – from the agents' perspective – becomes conventional itself. Following Knight (1921), Salais and Storper (1997) suggest two ways of apprehending uncertainty: specialisation and consolidation. Consolidation is the process by which agents aggregate things into a class or group and then measure the deviation from the overall tendency probabilistically. In other words, the agents reduce uncertainty to risk – though only at an epistemic level. In Part I we showed how this reduction of uncertainty to risk was taken for granted at an ontological level by game theorists thereby excluding the dynamic account proposed by the EC.

Specialisation, on the other hand, is a process that recognises the uniqueness of things. Radical uncertainty is maintained from the agents' perspective since they remain aware of the fundamental uncertainty that characterises their interactions with each other. In practice, small gaps between expected outcomes and actual behaviour do not necessarily lead to the collapse of conventions because repeated success in coordination leads to increased confidence in the established practices and reduces the need for interpretation and questioning. Thus, when new problems or impediments to coordination eventually arise, there is a tendency to discount their importance and stick to the established practice. In this manner conventional coordination leads to a weakening of the critical capacities of agents to the point where they are less reflective. According to conventionalists it is this process that accounts for the automatic feel of some conventional behaviour: 'hardened' conventions become routines (Salais and Storper 1997; Favereau and Le Gall 2002).

In contrast, the equivalences that underpin the different orders of worth and their respective tests can be the subject of continuous debate. Cases where coordination breaks down and past actions and assumptions are critically investigated are usually the result of perceived injustices felt by all or part of the community

concerned. Outside of these cases of disagreement however, people are usually engaged in much more peaceful and cohesive collaboration. Under these conditions their reflective capacities are more likely to be engaged when faced with tests of worth which are quite often routine elements of daily life (such as annual reviews at work and salary negotiations).

These variations in agents' degrees of reflexivity make convention and uncertainty fundamentally dynamic concepts. Conventions are the current states of a reversible process of consolidation or deconstruction depending on whether they are automatic or subject to questioning. Throughout this process individual perceptions of conventions can vary from a highly naturalised view (that they are immutable facts) to a constructivist view (that they are up for grabs). In positing reflexive agents capable of seeing their coordinated activities as constructed and therefore also capable of doubt and change, the EC has extended the role of radical uncertainty as proposed by the post-Keynesians. Nevertheless, perfectly reflexive agents who are unable to see at least some established practices as natural would be faced with chaos and consequently be incapable of action. Conventionalists recognise this problem by adopting a more realistic theory of limited reflexivity (Bessis 2008).

We have also highlighted that, in speaking of conventions as states of a process governed by variation in the degrees of reflexivity of agents, conventionalists refer both to the way in which conventions are understood by agents (an epistemic dimension) but also to the actual variation in conventional practices (an ontological dimension). Even if conventions are understood naturalistically, actual behaviour can be sufficiently diverse to produce a multitude of variations of the same convention[12]. These can be seen as small adaptive variations based on the fact that a given situation is never reproduced identically. Once seen as constructed however, conventions can be changed consciously and deliberately. There is a qualitative difference between these two types of change: whilst the former is a process of adjustment, the latter introduces the possibility of historical novelty.

Conclusion

We have shown how contrasting visions of the relationship between uncertainty and convention are crucial to the demarcation between self-consciously heterodox and

[12] Which remains *the same* convention precisely because it is not subject to questioning and further interpretation by the agents.

mainstream theories of social coordination. On the one hand, game theorists employ mathematical tools to generate and maintain stable outcomes in their models. These are inevitably presented as solution concepts, and one of their principle aims is to reduce or eliminate uncertainty. We have seen how this tradition, for all its mathematical sophistication, relies on a probabilistic account of uncertainty as risk and therefore cannot accommodate the Keynesian conception of radical uncertainty as described and developed by the post-Keynesians. Finally, we have sketched an alternative theory of conventions that takes uncertainty seriously and departs from the conception of conventions as solutions. We now conclude with some observations on the implications of this study for the question of pluralism in economics.

Significant developments within economics, principally through the rise of game theory, *have* contributed to a widening of the scope of economic analysis. The case of convention is a prime example of this. A phenomenon like convention, which might have been considered either uninteresting or perhaps threatening to an earlier set of neoclassical theoretical concerns, has been brought much closer to the core of mainstream research. In terms of theoretical interests, the overlap with the heterodoxy has undoubtedly become significant. Nevertheless, doubts are immediately raised following a closer examination of the details of heterodox and mainstream theories of convention.

Our analysis reveals a clear cut divergence in methods: a modelling emphasis in the case of classical and evolutionary game theory; and a more descriptive and historical focus in the case of the two heterodox schools. Moreover, this methodological divide can be explained in terms of an underlying ontological disparity. Both post-Keynesians and conventionalists are categorical in allowing for the existence of radical uncertainty, whilst game theorists deny it implicitly. Our conclusions suggest that, whilst the study of convention shows that there has been significant change in the aims and scope of mainstream economics, the transformation of convention from social phenomenon to solution concept in the hands of game theorists demonstrates a commitment to methodological monism. In this case at least, apparent theoretical diversity is not accompanied by pluralism of methods.

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