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Ramsey and Keynes revisited

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This paper re-assesses Ramsey's influence on Keynes. It is argued that the Standard View has restricted attention to the implications for probability theory of Ramsey's criticisms of Keynes's concepts of logical probability-relations and non-numerical probabilities. Building on the work of both Coates (1996) and Misak (2016), an Alternative View is proposed in which Ramsey's influence on Keynes is seen as principally philosophical. Specifically, the Alternative View recognises Ramsey's adoption of the logical pragmatist philosophy of C. S. Peirce from 1924 onwards with a dispositional theory of belief in which beliefs are treated not only as useful mental habits that can successfully guide future actions but also as able to provide true explanations of observed empirical facts. The textual evidence is examined, particularly Keynes's biographical essay on Ramsey, which, it is argued, supports the contention that Keynes fully appreciated and was sympathetic to Ramsey's pragmatism especially the importance of vague knowledge and the need for the development of human logic as the study of reasonable human behaviour.

Key words: Pragmatism, Probability theory, Degrees of belief, Human logic, Vague knowledge
JEL classifications: B5, B310, D8

1. Introduction

There is continued interest in Keynes's *A Treatise on Probability* (1921) (hereafter referred to as the *Treatise*) as evidenced by the recent special issue of the *Cambridge Journal of Economics* to celebrate the centenary of its publication and that of Knight's *Risk, Uncertainty and Profit* (1921). The New Keynesian Fundamentalist project, initiated by the work of Meeks (1991), Carabelli (1988), O'Donnell (1989) and Lawson (1985), seeks to locate Keynes's radical break in economic theory in the ontological, epistemological and methodological positions adopted in the *Treatise*. This has given rise to a 'continuity-or-change?' debate (Gerrard, 1992) over the extent to which Keynes remained wedded to those philosophical positions, especially in the 1930s as the *General Theory* was developed.

A central figure in the 'continuity-or-change?' debate is Frank Ramsey and the extent of his influence on Keynes. The Standard View is that Ramsey was highly critical of two of Keynes's central arguments: (i) probability as a logical relation; and (ii) probability as mostly non-numerical. Ramsey is seen as advocating a subjective theory of probability

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in which probabilities can be measured by use of the betting-quotient method, and this ultimately led to the development of subjective expected utility (SEU) theory. Scholars including Bateman (1987), Carabelli (1988), O'Donnell (1989), Runde (1994) and Davis (1994); have disagreed over the extent to which Keynes accepted Ramsey's criticisms and adopted a subjective theory of probability.

This paper seeks to revisit the influence of Ramsey on Keynes and to argue that the parameters of the debate have been set too restrictively by focusing only on probability theory. This paper explores the Alternative View that takes as its starting point the reinterpretation by Coates (1996, 1997) of the development of Keynes's philosophical thought after the *Treatise*, and the analysis by Misak (2013, 2016, 2020) of the development of American classical pragmatism and its influence on Cambridge philosophy particularly Ramsey and Wittgenstein. The central proposition of the proposed Alternative View is that the principal significance of Ramsey's influence on Keynes is largely philosophical, leading Keynes to adopt a more pragmatist orientation as evidenced in his increasing concern with vague knowledge and the need to develop the study of 'human logic'.

The paper is structured as follows. Section 2 sets out the Standard View of Ramsey's contribution and his influence on Keynes's thinking in probability theory. Section 3 develops the Alternative View of Ramsey in which the emphasis is on his move from 1924 onwards to a pragmatist philosophical position influenced primarily by the logical pragmatism of C. S. Peirce. Section 4 explores the textual evidence that Keynes adopted a more pragmatist orientation as a result of the influence of Ramsey. Section 5 provides a summary of the key arguments and offers some concluding thoughts on the possible significance for Keynes's economics of his adoption of a pragmatist philosophy.

2. Ramsey and Keynes: the Standard View

2.1 The Standard (Economics) View of Ramsey

The Standard View within economics is that Ramsey (1926) and de Finetti (1931) independently developed the concept of subjective (or personal) probability which was subsequently fashioned by Savage (1954) into SEU theory. The Ramsey-de Finetti-Savage approach to probability has become the basis for the orthodox economic theory of choice under risk and uncertainty. Ramsey's theory of subjective probability emerged out of his critique of the logical (or objective) theory of probability proposed by Keynes in the *Treatise*. Ramsey's criticism of Keynes's argument that most probabilities are non-numerical led Ramsey to propose the betting-quotient method for measuring subjective probabilities.

In the Standard View Ramsey's pragmatic philosophy is sometimes noted but largely ignored. Braithwaite, a close friend of Ramsey and editor of both Ramsey's *The Foundations of Mathematics and other Logical Essays* (hereafter referred to as the *Foundations*) and the Collected Writings edition of Keynes's *Treatise* exemplifies the tendency to downplay Ramsey's pragmatism much in the same way as Ramsey's socialist political views have been largely ignored. In 1931 Braithwaite went only as far as recognising that Ramsey was 'moving towards a kind of pragmatism' (p. ix). Forty years later, Braithwaite was still giving little emphasis to Ramsey's pragmatism. In his Editorial Foreword to Keynes's *Treatise*, Braithwaite discusses Ramsey's critique in

some detail and goes as far as suggesting that 'Keynes might not be unsympathetic to the restricted betting-quotient theory' (1972, p. xxii) but there is only a rather oblique reference to Ramsey's pragmatism, limited to a comment on Ramsey following C.S. Peirce in believing that induction did not need to be justified by the principle of limited independent variety. However, the reasons for Braithwaite attaching so little importance to pragmatism in his presentation of Ramsey's thought remain unclear as Misak (2020) explains:

> In a 1982 interview, Braithwaite remarked on how surprised he was, when he went through Ramsey's papers after his death, at the extent of his pragmatism – 'mathematical logicians are not usually pragmatists'. He had thought Ramsey was only a pragmatist about induction, an idea which appealed to Braithwaite, and which he would mine after Ramsey's death. Braithwaite was not himself inclined to take pragmatism farther than that. Hence the critical character of his remark in his obituary of Ramsey: 'Recently (in company with Bertrand Russell) he had been descending the slippery path to a sort of pragmatism.' (p. 280)

Runde (1994, 1995, 2003) and Kay and King (2020) follow Braithwaite in treating the betting-quotient method of measuring subjective probabilities as the core of Ramsey's contribution with the pragmatist philosophical foundations as peripheral. Carabelli (1988) and O'Donnell (1989) give more attention to Ramsey's pragmatism but do so in order to argue that Keynes rejected Ramsey's pragmatism.

2.2 The Standard View of Ramsey's influence on Keynes

The Standard View is that Keynes took Ramsey's criticisms of the *Treatise* very seriously but there is considerable disagreement, the so-called 'continuity-or-change?' debate (Gerrard, 1992), over the extent to which Keynes accepted Ramsey's subjective theory of probability and the betting-quotient method of measuring degrees of belief. However, within the 'continuity-or-change?' debate, there has been broad agreement that Ramsey's influence did not extend to any fundamental change in the philosophical foundations of Keynes's thought influenced by Ramsey's pragmatism.

The Standard View of Ramsey's influence on Keynes first emerged in Braithwaite's Editorial Foreword to the Collected Writings edition of the *Treatise* in which Braithwaite argued that Keynes agreed with Ramsey that probability is concerned with degrees of belief not the objective relations between propositions and, as discussed above, suggested that Keynes may have been open to the betting-quotient method to derive numerical probabilities. Braithwaite's interpretation of Ramsey's influence on Keynes is rejected by both Carabelli (1988) and O'Donnell (1989) who argue for continuity in Keynes's thought as regards both the theory of probability and its philosophical foundations. Carabelli writes that 'Keynes, notwithstanding the lip-service he paid to Ramsey's criticism in his essay on Ramsey … did not either change substantially his views or embrace Ramsey's views on probability' (1988, p. 97). Similarly, O'Donnell states that Keynes 'neither threw over his particular conception of probability nor abandoned his general philosophical position in favour of Ramsey's ideas' (1989, p. 141). Instead O'Donnell interprets Keynes's later economic writings, particularly the *General Theory*, as reflecting a greater emphasis on uncertainty and what he calls 'weak rationality' in contrast to the 'strong rationality' of his logical theory of probability in the *Treatise*.

O'Donnell (2021) reiterates the Standard View that Ramsey had no significant impact on Keynes's thinking on either probability theory or philosophy. He particularly

focuses on Keynes's 1933 biographical essay on Ramsey (see Section 4 below) and interprets Keynes's statement that 'So far I yield to Ramsey – I think he is right.' (1933, pp. 300–301) as merely recognition that Ramsey's results follow from Ramsey's axioms but Keynes did not accept Ramsey's axioms.

Carabelli remains the strongest proponent of the continuity thesis, as evident in her recent book, *Keynes on Uncertainty and Tragic Happiness* (2021), in which she argues that the essence of Keynes's philosophical thought including his rejection of pragmatism were substantially developed by 1907, influenced primarily by Moore and Russell and remained fundamentally unchanged thereafter. In particular, Carabelli rejects the view that Keynes's critique of scholasticism was due to Ramsey and argues that Keynes's argument on the fallacy of dealing with the vague concept of probability as if it were precise was already fully elaborated in 1907.

The strongest advocate of the change thesis in Keynes's theory of probability is Bateman (1987) who argues that Keynes's conception underwent two changes after the publication of the *Treatise*. The first change was in response to Ramsey's criticism when Keynes accepted that probability refers to subjective degrees of belief. The second change occurred around 1938 in response to Tinbergen's early econometric work when Keynes moved from a subjective epistemic conception of probability (i.e., degrees of belief) to a dualistic conception of probability with an aleatory (i.e., frequency) theory of probability being appropriate for physical phenomena and the subjective epistemic theory appropriate in economics when there is insufficient evidence for a stable frequency distribution.

Runde (1994) takes a more middle-of-the-road position in the 'continuity-or-change?' debate, arguing that Keynes yielded to Ramsey as regards the existence of logical probability relations but retained a comparative conception of probability that allowed for non-numerical probabilities. Davis (1994, 2003) similarly argues that Keynes accepted Ramsey's criticism of logical probability relations but this did not impact on Keynes's conception of probability as essentially non-numerical and comparative. However, Davis argues that Keynes's repudiation of logical probability relations signalled a change in his philosophical thought but characterises this change as a rejection of intuitionism and Neo-Platonism with no mention of pragmatism.

3. Ramsey on probability and philosophy: the alternative view

The Standard (Economics) View of Ramsey has been criticised by both Coates (1996) and Misak (2016, 2020). Coates recognises that Ramsey's pragmatist philosophical tendencies were clear in his critique of Keynes's *Treatise*. But Coates goes much further in claiming that 'Much of Keynes's understanding of later Cambridge philosophy could … be due to Ramsey'. (1996, p. 139) In particular Coates identifies Keynes's arguments on the dangers of scholasticism and treating what is vague as if precise and to be fitted into exact logical categories as directly attributable to Ramsey. Coates also quotes Fann (1971) that Ramsey's logical pragmatism contributed to the pragmatic tendency in Wittgenstein's later work.

In her *Cambridge Pragmatism: From Peirce and James to Ramsey and Wittgenstein* (2016), Misak argues for a direct link between American classical pragmatism and the philosophical developments in Cambridge in the interwar years. Misak differentiates two main conflicting strands in American classical pragmatism that are still evident in modern pragmatist thought – truth-affirming pragmatism associated with Peirce and

the truth-denying pragmatism associated with James. Misak views this tension in pragmatism as being reflected in the differences between Ramsey and Wittgenstein, with Ramsey as a major influence on Wittgenstein, and vice versa. Misak aligns herself with the truth-affirming pragmatism of Peirce and Ramsey.

The proposed Alternative View of Ramsey puts his pragmatism (and socialism) at the very core of his thought. As a consequence, any understanding of Ramsey's influence on Keynes is necessarily partial without a fuller appreciation of the pragmatist foundations of his critique of Keynes's *Treatise*.

3.1 The 1922 review of A Treatise on Probability

Ramsey's first published reaction to Keynes's *Treatise* was a review published in *The Cambridge Magazine* in January 1922 as a second-year undergraduate. The review provides an immediate reaction that summarises some of the key points of Keynes's logical theory of probability and indicates some logical errors and possible inconsistencies. Ramsey's critique at this stage is not pragmatist in orientation; his detailed study of Peirce began in 1924 (Misak, 2020). Rather, the 1922 review represents more of a starting point and indication of the direction of travel in his thinking on probability, with the focus on critique rather than constructing an alternative theory at this stage. But the three principal targets of Ramsey's later fuller critique of Keynes are evident in the 1922 review: (i) the concept of a logical probability-relation (i.e., the *existence* issue); (ii) the non-numerical and possibly non-comparable nature of some probabilities (i.e., the *measurement* issue); and (iii) the relationship between rational degrees of belief and the degree of logical insight (i.e., the *logical* issue).

At least publicly, Ramsey's initial criticism of Keynes's concept of a probability-relation is somewhat muted. Misak (2020) quotes Ramsey's notes on his 1922 review at the time as emphasising that 'there are no such things as these [probability] relations' (p. 114). By the time of his 1926 paper 'Truth and Probability', Ramsey would describe this aspect of his critique as the 'more fundamental criticism of Keynes' views' (1990, p. 57). In his 1922 review, using the example of 'my carpet is blue' and 'Napoleon was a great general', Ramsey criticises Keynes's first axiom on the existence and uniqueness of a probability-relation arguing that there is no probability-relation between these two propositions, implying that the very existence of a probability-relation must presuppose some degree of connectedness. Formally, Ramsey is correct that Keynes's first axiom only rules out the existence of probability-relations for self-contradictory and inconsistent propositions and hence allows for the possibility of a probability-relation between two seemingly unconnected propositions. But Keynes deals with the problem of unconnected propositions elsewhere by allowing for non-existent probabilities which would surely apply to Ramsey's example as would Keynes's formal definition of relevance/irrelevance. This criticism becomes superfluous in 'Truth and Probability' by which time Ramsey explicitly rejects the existence of probability-relations.

If the probability exists, Ramsey argues that '… it is surely obvious that probabilities may be numerical or comparable without our being able to assign their numerical values or compare them, owing to the imperfection of our logical insight' (1989, p. 220). Ramsey did not consider the non-numerical or non-comparable nature of some probabilities to be an innate quality of these probabilities but rather due to our failing to devise appropriate methods of measurement or comparison, a failing he sought to address in 'Truth and Probability'. But in admitting probabilities may be unknown

due to imperfect logical insight, Ramsey believes that Keynes is fatally undermining his theory of probability, a danger that Keynes is only too aware of and hence his insistence in the *Treatise* that

> The degree of probability which it is rational for us to entertain, does not presume perfect logical insight, and is relative in part to secondary propositions we in fact know… If we do not take this view of probability, if we do not limit it in this way and make it, to this extent, relative to human powers we are altogether adrift in the unknown; for we cannot ever know what degree of probability would be justified by the perception of logical relations which we are, and must always be, incapable of comprehending. (as quoted by Ramsey, 1989, p. 220)

Ramsey had identified a fundamental tension running throughout the *Treatise* between rational degrees of belief as an objective logical relation and actual degrees of belief held by individuals and dependent on their logical abilities. Ramsey's solution was a philosophical one – to reject the Neo-Platonism inherent in the concept of a probability as a logical relation and embrace the pragmatist alternative of degrees of belief as a disposition to act.

3.2 Ramsey's pragmatism

The emergence of the pragmatist orientation in Ramsey's thought can be traced back to 1924 between his initial 1922 review of Keynes's *Treatise* and his more extensive critique in 1926. There are two main attributed sources of Ramsey's pragmatism – Russell and Peirce. In his 1927 paper 'Facts and Propositions' presented to the Joint Session of the Aristotelian and Mind Societies, Ramsey states that: 'My pragmatism is derived from Mr Russell; and is, of course, very vague and undeveloped. The essence of pragmatism I take to be this, that the meaning of a sentence is to be defined by reference to the actions to which asserting it would lead, or, more vaguely still, by its possible causes and effects. Of this I feel certain, but of nothing more definite.' (1990, p. 51)

The other main influence on Ramsey's brand of pragmatism was Peirce. Ramsey was already familiar with Peirce's work on logic but a fuller appreciation of Peirce's pragmatism came via C. K. Ogden who had engaged Ramsey to assist in the production of the English translation of Wittgenstein's *Tractatus* (1922, [1974]). Ogden was very familiar with Peirce's pragmatist thought through Lady Victoria Welby with whom Peirce had corresponded extensively (Misak, 2016). Ogden published the British edition of a collection of Peirce's 1923 papers, *Chance, Love, and Logic* which Ramsey read during the winter of 1923–24.

The key features of Ramsey's pragmatist philosophy are set out in 'Facts and Propositions' (1927), 'Philosophy' (1929A) and 'Knowledge' (1929B). As is clear in the quote above from 'Facts and Propositions' in which Ramsey acknowledges the influence of Russell, Ramsey adopted the pragmatist dispositional view of belief (and meaning) as the action to which a belief would lead. The dispositional view of belief is a characteristic feature of the pragmatism of both Peirce and James. Ramsey's attachment to Peirce's logical pragmatism is evident in his reference to 'causes and effects'. Beliefs are both forward-looking in their influence on future actions (i.e., effects), and backward-looking as explanations of past empirical facts (i.e., causes). It is this duality in logical pragmatism in which truth is a human creation validated by both explanation and successful action that differentiates the pragmatism of Peirce and Ramsey (and, indeed, Russell) from the instrumentalist pragmatism of James for whom the emphasis is entirely on truth as usefulness.

The forward-looking nature of philosophy is reiterated in Ramsey's 1929 paper, 'Philosophy' in which he justifies the seriousness and usefulness of philosophy (contra Wittgenstein). Ramsey sees philosophy as 'a logical system with primitive terms and definitions' but disagrees with the backward-looking focus of Moore: 'I do not think that it is necessary to say with Moore that the definitions explain what we have hitherto meant by our propositions, but rather that they show how we intend to use them in the future' and adding that 'meaning is mainly potential' (1990, p. 1). It is also in this paper that Ramsey reflects on his previous attachment to the analytical approach as one of 'excessive scholasticism' (1990), defining scholasticism as 'treating what is vague as if it were precise and trying to fit it into an exact logical category' (1990, p. 7).

In the short note, 'Knowledge' (1929B), Ramsey sets out three conditions for a belief to be treated as knowledge: (i) true; (ii) certain; and (iii) obtained by a reliable process. The truth criterion requires that the belief is both epistemologically justified (i.e., a credible explanation of the facts) and leads to successful action. The certainty requirement involves the absence of doubt which, in turn, depends in part on the reliability of the process by which the belief was formed.

3.3 'Truth and Probability'

'Truth and Probability' was originally read in part to the Moral Sciences Club in 1926 and only published in full posthumously in 1931 in the *Foundations*. In it, Ramsey sets out a pragmatist critique of Keynes's logical theory of probability. The substance of the paper is summed up in the four opening quotes from Aristotle on truth and falsity, Donkin on the consistency requirement of beliefs, Peirce on reasoning as the discovery of new truths, and Blake on the linguistic requirement on truth.

The starting point for Ramsey's critique remained the same three issues as the 1922 review – the existence issue, the measurement issue and the logical issue. From the perspective of (radical) Keynesian scholarship, the emphasis has been on the existence issue and Ramsey's 'more fundamental criticism of Mr, Keynes' views, which is the obvious one that there really do not seem to be any such things as the probability relations he describes' (1926, [1990]), p. 57). As discussed in the next section, the debate amongst Keynesian scholars has been whether Keynes subsequently accepted Ramsey's critique of objective logical probabilities. In contrast, mainstream economics has focused on the measurement issue and Ramsey's proposal of the betting-quotient method that has ultimately become the foundation of SEU theory and the economic theory of choice under risk and uncertainty. Both for radical Keynesians and more mainstream economics, Ramsey's discussion of the logical issue has remained peripheral since the denial of the existence of objective logical probabilities and the proposal of a method for measuring subjective probabilities as a consistent and coherent system effectively resolved the fundamental tension in Keynes's *Treatise* between rational and actual degrees of belief. But this is to ignore the critical importance of the pragmatist philosophical foundations of 'Truth and Probability' that are particularly prominent in Ramsey's discussions of the logical issue but also underpin both his rejection of probability relations and the betting-quotient method for measuring probabilities.

As discussed above, a key foundation of Ramsey's pragmatism is the dispositional nature of belief in which a belief represents a disposition to act in a particular way in particular circumstances. Necessarily the disposition of an individual to act in a particular way depends on their actual degree of belief. From this pragmatist perspective,

it makes no sense to talk about probability relations that we cannot comprehend, and it is difficult to understand how the degree of preparedness to act in a particular way (i.e., the individual's degree of belief) can be justified purely by a logical relation. Ultimately Ramsey did not, in a pragmatist sense, consider the concept of probability as an objective logical relation to be a useful concept either as a description or explanation of actual human behaviour.

The dispositional nature of belief also provided the insight for the betting-quotient method for measuring probabilities. Dating back to the Metaphysical Club and the very origins of American classical pragmatism, it was common for pragmatists to describe the dispositional nature of belief in terms of a bet or wager, albeit in a qualitative sense. For example, Supreme Court Justice Wendall Holmes, a founding member of The Metaphysical Club, described himself 'as a *bet*tabilitarian. I believe that we can *bet* on the behaviour of the universe in its contact with us' (1929; quoted in Novick, 1992, p. 715; italics in original). Ramsey echoes similar sentiments in 'Truth and Probability' when justifying the betting approach, arguing that 'this will not seem unreasonable when it is seen that all our lives we are in a sense betting' and goes on to give the example of 'whenever we go to the station we are betting that the train will really run, and if we had not a sufficient degree of belief we should decline the bet and stay at home' (1990, p. 79).

The core of Ramsey's pragmatist critique of Keynes's logical theory of probability and indeed of probability theory in general lies in the final two sections of the paper on the logic of consistency and the logic of truth. Ramsey bases his distinction between two different types of logic on Peirce's distinction between explicative/analytic/deductive arguments and amplifiative/synthetic/inductive arguments. The former represents the logic of consistency which Ramsey variously describes as the 'lesser logic' or 'formal logic' whereas the latter represents the logic of truth, also referred to by Ramsey as the 'larger logic', 'inductive logic', 'the logic of discovery' or 'human logic'. Ramsey considers formal logic as the application of the deductive method to arrange knowledge such that inconsistencies and contradictions are eliminated. The theory of probability is an attempt to generalise formal logic to encompass partial belief. From this perspective both Keynes's theory of probability and Ramsey's betting approach to actual degrees of belief are (formal) logical theories of probability in the sense of being attempts to construct a consistent system of probabilities where consistency is defined as eliminating guaranteed losses – the so-called Dutch Book problem. Apart from the dubious status of the logical probability relations, Ramsey's considered the chief logical weakness of Keynes's theory as his reliance on the Principle of Indifference to provide a consistent system of equal *a priori* probabilities in the absence of any knowledge to favour any particular alternative belief. As Keynes himself showed in the *Treatise*, the requirements of an exhaustive and mutually exclusive finite set of alternatives are seldom met and even then, frequently liable to generate paradoxes and inconsistencies. Effectively Ramsey proposed the betting-quotient method (and, specifically, the doctrine of mathematical expectation) as an alternative to the Principle of Indifference to provide the foundation for constructing a consistent system of probabilities.

According to Ramsey, probability theory is concerned with probabilities as a logically consistent system. But Ramsey argued that there is another type of consistency we demand of probabilities – consistency with the facts. In this Ramsey explicitly acknowledges that he is largely following the pragmatism of Peirce, labelled 'truth-affirming pragmatism' by Misak and 'logical pragmatism' by Coates. Consistency with the facts

is the province of the logic of truth or human logic, a normative logic concerned with what we ought to believe, to which Ramsey applies the term 'reasonable': 'Logic we may agree, is concerned not with what men actually believe, but what they ought to believe, or what it would be reasonable to believe.' (1926 [1990], p. 89) Determining what Ramsey terms the 'calculus of objective partial belief' is not a tautology that is, it is not a deduction from known truths.

But Ramsey goes much further that just acknowledging that the logic of truth is independent of formal logic, arguing that the logic of truth may at times be incompatible with formal logic. Ramsey is adopting a rather nuanced approach to rationality and reasonableness that allows for courses of action which cannot be deduced from known facts but can be justified by the known facts. Whereas Keynes conceived of the probability relation as a (formal) logical relation that justified the rational degrees of belief, Ramsey followed Peirce in treating the probability relation as a process of discovery, forming a novel hypothesis based on known facts. It is the process of discovery that Peirce called 'abductive reasoning'. And, like Peirce, Ramsey looked towards the natural sciences as the model of how the truth or falsity of hypotheses (and the beliefs and habits to which they lead) is determined through a process of natural selection. As Ramsey put it, 'This is a kind of pragmatism: we judge mental habits by whether they work i.e., whether the opinions they lead to are for the most part true, or more often true than those which alternative habits would lead to.' (ibid., pp. 93–94)

A critical aspect of the Peirce-Ramsey distinction between formal and human logic, particularly in regard to Ramsey's critique of Keynes's *Treatise*, is the treatment of induction. Peirce and Ramsey follow Hume in arguing that induction cannot be reduced to deductive inference or justified by formal logic. For Ramsey, the justification of induction is a (logical) pragmatist justification that induction is reasonable because it works and is consistent with the facts. 'We are all convinced by inductive arguments, and our conviction is reasonable because the world is so constituted that inductive arguments lead on the whole to true opinions.' (ibid., p. 93) Ramsey recognised that the argument for induction is itself an inductive argument – the future success of induction is based on an inductive inference from past success – but Ramsay does not consider this circular argument to constitute a vicious circle.

Another aspect of Ramsey's discussion of formal and human logic is the relationship between his pragmatist approach to probability and the frequency theory of probability. At the start of 'Truth and Probability' (1926), Ramsey recognises that there are two very different approaches to probability – the logical approach of probability as partial belief, and the frequency approach adopted by statistics and the physical sciences. Ramsey also recognises a general bias towards frequency theory because of the ordinary-language meaning of probability as a proportion, and the usefulness of frequency theory as a simple and least controversial interpretation of the mathematical calculus of probabilities. Returning to the evaluation of frequency theory in the discussion of the logic of consistency, Ramsey is critical of those who seek to reduce the logical theory of objective partial belief to frequency theory: 'The pretensions of some exponents of the frequency theory that partial belief means full belief in a frequency proposition cannot be sustained.' (1926, p. 84). But Ramsey accepts that the very idea of partial belief involves reference to a hypothetical or ideal frequency and that the two interpretations of probability share the same 'inner meaning' (1926). Hence Ramsey argues that the degree of belief can be interpreted as justifying the proportion of times that an action is best repeated. But the argument is incomplete, possibly contradictory,

and seems to apply only to a series of repeatable events – Ramsey uses the example of thunder and lightning. Ramsey was well aware of the incompleteness of his critique of frequency theory and returned to the issue subsequently.

3.4 Further development of Ramsey's views on probability and statistics

Ramsey planned to develop 'Truth and Probability' into a full book of the same title and at the time of his death had written initial drafts for five chapters subsequently published as *On Truth* (1991). The groundwork for the further development of his 1926 paper was set out in four papers written in 1928 and 1929 and included in both the *Foundations* and Mellor's volume of Ramsey's *Philosophical Papers* – 'Reasonable Degree of Belief' (1928A), 'Statistics' (1928B), 'Chance' (1928C) and 'Probability and Partial Belief' (1929C).

In 'Reasonable Degree of Belief', Ramsey explores what is meant by reasonable. His starting point is Peirce's notion of reasonable as a habit which leads Ramsey to consider a frequency interpretation of a reasonable degree of belief as the proportion of cases in which habit leads to truth. However, Ramsey identifies a number of difficulties with the frequency interpretation of a reasonable degree of belief. Actual habits may not always represent reasonable degrees of belief because of misleading previous experience. Also, the frequency approach cannot be used when there are very few instances. Ramsey differentiates between probability as the proportion of cases and probability as the degree of belief in a theory of the world. The degree of belief in a theory can only be treated as a frequency when considering general habits with many instances. Finally, Ramsey argues that the frequency approach does not apply to induction because induction 'is not the sort of thing that has a chance' (1990, p. 97).

Given the difficulties in defining reasonableness in frequency terms, Ramsey concludes that a definition of reasonableness is not required but rather what is needed is an understanding of the content and utility of logic. He distinguishes four components of logic: (1) the philosophical and psychological investigation of thought, truth and reasonableness; (2) formal inference (i.e., mathematics); (3) hints on avoiding confusion; and (4) habits of inference. Ramsey focuses his attention on (2) and (4), the two components of logic that are useful for judgement. The distinction between formal inference and habits of inference is the same distinction that Ramsey made in 'Truth and Probability' between formal logic and human logic. Mathematics is the formal logic of consistency; habits of inference constitute the human logic of truth. Ramsey again follows Peirce in seeing logic as a form of self-control preventing us from acting rashly on a desire that is only of temporary importance, and instead ensuring that we act on the basis of habits attuned to achieving more permanent desires. For Peirce and Ramsey, acting reasonably involves considering all relevant evidence before forming a judgement, acting consistently and recognising the difference between biased and random sampling.

'Statistics' (1928B) is a short note that focuses on Fisher's definition of statistics as being concerned with abbreviating facts interpreted as a random selection from an infinite population. Ramsey considers the notion of an infinite population to be 'a stupid fiction, which cannot be defended except by some reference to a limit, which destroys its sense.' (1928B, p. 102) Ramsey also identifies a major limitation of statistics and specifically Fisher's proposed maximum likelihood estimation method as unable to

deal with a new instance: 'For the use of the figures to give a degree of belief to a new instance no rule can be given.' (1928B)

Ramsey reiterates his criticism of the concept of infinite populations in 'Chance', (1928C). He also elaborates on the distinction between chances as degrees of belief and actual degrees of belief. Chances exist within a deductive system of beliefs that obeys the rules of probability. The actual degrees of belief of individuals approximate those deduced from the system of beliefs (i.e., chances) but adjusted for the particular knowledge of the individual. Ramsey also develops his views on the nature of statistical science which he conceives of as consisting of three parts: (i) the collection and arrangement of data; (ii) induction; and (iii) causal analysis. Ramsey considers induction as the construction of a system of chances (i.e., degrees of belief) from data using the method of maximum likelihood. Statistical causal analysis involves the explanation of something that happens repeatedly. 'Statistical causal analysis presupposes a fundamental system within which it moves, and which leaves it unchanged.' (1928C, p. 108) Statistical causal analysis progresses by deriving a narrower system from the fundamental system to include the particular empirical proposition under investigation. It is this empirical proposition, not the underlying narrower or fundamental systems of belief, which is then modified or rejected in the light of the results of statistical analysis. Ramsey's views on the statistical causal analysis are consistent with the pragmatist critique of scepticism and universal doubt as well as being prescient of Kuhn's theory of scientific revolutions (1970) in which normal science is characterised as a search for consistency between theory and observation with anomalies representing puzzles to be solved within a system of beliefs known as a paradigm.

'Probability and Partial Belief'(1929C) is another short note written in the last year of Ramsey's life in which he acknowledges that 'The defect of my paper on probability ["Truth and Probability"] was that it took partial belief as a psychological phenomenon to be defined and measured by a psychologist.' (1929C, p. 95) Ramsey considers a numerical probability as being sometimes useful in a practical decision but requires the application of mathematical expectation to ensure consistency and a non-monetary measure of utilities. Ramsey also reiterates the restricted relevance of probability theory compared to theory in a more general sense. Our interest in theory as a set of propositions 'comes from the possibility of our adopting one of them as all we believe' (1929C, p. 96). In contrast, 'a probability-theory is a set of numbers associated with pairs of propositions obeying the calculus of probabilities', our interest in which 'comes from the possibility of acting on it consistently' (1929C).

4. Ramsey's influence on Keynes: the alternative view

The proposed Alternative View is that Ramsey's influence on Keynes was principally philosophical and resulted in a more pragmatist orientation in Keynes's later economic writings. Dillard (1946) has been cited as one of the few to appreciate the pragmatist turn in Keynes's later thought, but in the paper entitled 'The Pragmatic Basis of Keynes's Political Economy', there is no discussion of Keynes's philosophical position as such. The word 'pragmatic' is used as an indication of Keynes's preparedness to change his views as the situation dictated rather than a dogmatic adherence to a pre-existing theoretical position. Indeed, the paper is more concerned with Keynes's political philosophy as a liberal. It is only in his later 1955 paper that Dillard links the 'pragmatic nature of Keynes's thinking' directly with Ramsey, specifically quoting

the pragmatist maxim from Keynes's essay on Ramsey: '… the meaning of a sentence [concept] is to be defined by reference to the actions to which asserting it would lead.' (p. 9). Selsam and Wells (1949) also argue for a pragmatist orientation in Keynes's later economic writings in their Marxist critique of Keynes's philosophy and economics. 'Keynes's philosophical position is that of a logical positivist with an orientation towards American pragmatism' (p. 90), a position that they attribute to the influence of Ramsey.

Bateman (2021) has also recognised that the pragmatist philosophy of Ramsey influenced the style of model building adopted by Keynes in the *General Theory*. Bateman takes a very restricted view of Ramsey's pragmatism as the recognition of multiple motivations to human action and does not explore the antecedents of Ramsey's thought beyond a reference to Misak's biography of Ramsey. Bateman's principal argument is that Keynes agreed with Ramsey's wider conception of the motivations of economic behaviour, leading Keynes to adopt Ramsey's subjective theory of probability and to develop a confidence narrative to explain economic fluctuations.

A much more detailed case for the importance of Ramsey on Keynes's philosophical thought has been presented by Coates (1996, 1997). The starting point for Coates is that Keynes's *Treatise* should be seen as an artefact of the earlier analytic Cambridge philosophy of Russell, Moore and the early Wittgenstein. Coates believes that there was a fundamental shift in Keynes's philosophical thought after the publication of the *Treatise* away from analytic philosophy. One characteristic feature of this anti-analytic turn in the Cambridge philosophy is the emphasis on vague concepts and ordinary language. In this regard, Coates emphasises the influence of Wittgenstein after his return to Cambridge in 1929 and credits Keynes as 'one of the few philosophers to have worked out the implications for the social sciences of Wittgenstein's views on vagueness' (1996, p. xii). But Coates acknowledges the importance of Ramsey's influence on the philosophical thought of both Keynes and the later Wittgenstein. 'Much of Keynes's understanding of later Cambridge philosophy could … be due to Ramsey.' (1996, p. 139) Coates believes that Ramsey's pragmatist tendencies are evident in his criticisms of the *Treatise*, particularly on the limitations of formal logic in providing an understanding of probability. Coates also attributes Keynes's concerns about the dangers of scholasticism as expressed in a lecture on 6 November 1933 (see Rymes, 1989, p. 101) directly to Ramsey. Coates concludes that there is sufficient biographical and textual evidence that 'Keynes was influenced by the ideas of the later Cambridge philosophy' and that 'Keynes, Ramsey and Wittgenstein all followed roughly parallel routes in escaping from the formative ideals of analytic philosophy' (1996, p. 143).

Further support for Coates's contention that Keynes continued to be actively involved in philosophical debates in Cambridge in the late 1920s is provided by Misak in her recent biography of Ramsey, *Frank Ramsey: A Sheer Excess of Powers* (2020). Misak recounts that, after Wittgenstein's return to Cambridge in January 1929, Keynes, Ramsey, Sraffa and Wittgenstein met regularly in what was known as the 'Cafeteria Club' until the onset of Ramsey's fatal illness in late 1929 (Misak, 2020, p. 302).

4.1 The textual evidence

There are three principal pieces of textual evidence on Keynes's reaction to Ramsey's critique of the *Treatise*; (i) a 1922 letter to the Cambridge philosopher, C. D. Broad; (ii) a 1926 letter to F. M. Urban, the German translator of the *Treatise*; and (iii) the

biographical essay on Ramsey published in *Essays in Biography* in 1933 comprising Keynes's two previously published obituaries for Ramsey as well as selections from Ramsey's philosophical papers published in the *Foundations* (1931).

(i) Keynes's 1922 Letter to Broad

> But what I really attach importance to is, of course, the general philosophical theory. I am much comforted that you are in general agreement. But I find Ramsey and other young men in Cambridge are quite obdurate, and still believe that *either* Probability is a definite measurable entity, probably connected with Frequency, *or* is of merely psychological importance and is definitely non-logical. I recognise that they can raise some very damaging criticisms against me on these lines. But all the same I feel great confidence that they are wrong. However, we shall never have the matter properly cleared up until a big advance has been made in the treatment of Probability in relation to the theory of Epistemology as a whole. (Keynes to C. D. Broad, 31 January 1922, as cited in Coates, 1996, p. 73)

The letter to Broad written at the end of January 1922 contains Keynes's reaction to Ramsey's initial review of the *Treatise* published earlier that month in *The Cambridge Magazine*. It shows the high regard in which Keynes held Ramsey and the seriousness with which he took Ramsey's criticisms. Ramsey, it must be remembered, at the time was still only a second-year undergraduate student. Keynes notes the two main criticisms of his logical theory of probability in Ramsey's review, namely that (1) probabilities are measurable; and (2) probabilities are psychological rather than logical. Keynes also suggests that Ramsey's advocacy of measurable probabilities may be indicative of support for the frequency approach to probability. But at this point Keynes considers Ramsey's criticisms, although potentially damaging, to be wrong and of secondary importance. For Keynes the most important issue is the philosophical foundations of his probability theory, arguing that the progress in the development of probability theory requires progress in epistemology. And, of course, this is the route that Ramsey subsequently travelled, influenced by the logical pragmatism of Peirce.

(ii) Keynes's 1926 Letter to Urban

> I have not thought about the subject very deeply in recent times. But as time goes on I myself feel that there is a great deal in the book which is unsatisfactory, and, indeed I felt this even when I was writing it. It was published as it stood because it seemed to me that it would help on the subject that I should do so more effectively than if I was to try to make further refinements and revisions which might quite likely prove beyond my capacity. I believe that the ultimate theory of the subject may differ very considerably from mine. But I still think that the problems as I have posed them may be the right starting point for further research.
> Amongst those students in England for whose opinion I feel most respect I find a marked reluctance against finally abandoning some variant of the frequency theory. They admit my criticisms hold good on existing versions, and they are not yet ready to prepare a version which can resist them. But they maintain all the same that they have a strong instinct that some kind of frequency theory will be found in the end to be more fundamental to the whole conception of Probability than I have yet allowed. I shall not be surprised if they prove right. I suspect, however, that the first step forward will have to come through progress being made with the partly psychological subject of vague knowledge, and that further developments in a strictly logical field must wait for a clear distinction between logical probability proper and the theory of what I have called vague knowledge. (Keynes to F. M. Urban, 15 May 1926, as cited in Winslow, 1989, p. 5)

The letter to Urban shows that by 1926 Keynes was well aware of the unsatisfactory nature of the *Treatise* and suggests that he was aware of some of its limitations when it was published. Keynes was even prepared to countenance that a revised form of frequency

theory might prove to be more fundamental to probability theory. But Keynes had neither the time nor inclination to make substantial revisions to the *Treatise*. He still believed that the *Treatise* had value as 'the right starting point for further research' (1926). The reference to Ramsey is indirect although surely incontestable that it was Ramsey whom Keynes had in mind when referring to 'those students in England for whose opinion I feel most respect'. But Keynes had made some progress in the development of the philosophical foundations of probability theory by recognising the need to distinguish between 'logical probability proper' and the 'partly psychological subject of vague knowledge'. And this parallels Ramsey's direction of travel influenced by the logical pragmatism of Peirce. The letter to Urban is critical in providing evidence that Keynes's concern with vague knowledge pre-dates Wittgenstein's return to Cambridge in 1929, and indeed, as Carabelli (2021) has argued, echoes concerns that Keynes had expressed as early as 1907 on probability being a vague concept but wrongly treated as though it is precise. The letter to Urban also indicates that as early as 1926, Keynes had accepted Ramsey's pragmatist arguments in 'Truth and Probability' for the need to distinguish between probability as a consistent and coherent system of degrees of belief (i.e., formal logic) and probability as truth claims about the world (i.e., human logic).

(iii) Keynes's Biographical Essay on Ramsey

Keynes's biographical essay on Ramsey begins with his *Economic Journal* obituary which pays tribute to Ramsey's powers as an economist particularly as demonstrated in 'A Mathematical Theory of Saving' which Keynes describes as 'one of the most remarkable contributions to mathematical economics ever made' (1933, p. 295). But the emphasis in Keynes's essay is Ramsey's philosophy especially the previously unpublished philosophical papers which constituted the second part of the *Foundations* and which Keynes considered to be 'of greatest interest'. These papers showed Ramsey's pragmatist direction of travel in his philosophical thinking, what Keynes referred to as 'the peculiar flavour of his mind' (1933, p. 302). Just as Coates (1996, 1997) has argued, Keynes clearly recognised that Ramsey had moved on from the analytic Cambridge philosophy of Russell and the early Wittgenstein with these papers 'showing in some detail how far his [Ramsey's] mind was departing … from the formal and objective treatment of his immediate predecessors', a departure which Ramsey considered 'not unsympathetic' to Russell but 'repugnant' to Wittgenstein (Keynes, 1933, p. 299). In breaking from the analytic approach, Ramsey more than anyone reminded Keynes of Hume in his 'common sense' and 'a sort of hard-headed practicality' (Keynes, 1933, p. 301).

Keynes quotes Ramsey's dispositional definition of pragmatism as 'the meaning of a sentence is to be defined by reference to the actions to which asserting it would lead' (Keynes, 1933, pp. 299–300). Keynes considers the distinction between formal logic and human logic as the most important consequence of Ramsey's pragmatism. In the following much-quoted passage from his biographical essay, Keynes responds to Ramsey's criticisms of the *Treatise* and sets out the implications of Ramsey's pragmatism for probability theory:

> Formal logic is concerned with nothing but the rules of *consistent* thought. But in addition to this we have certain "useful mental habits" for handling material with which we are supplied by our perceptions and by our memory and perhaps in other ways, and so arriving at or towards truth; and the analysis of such habits is also a sort of logic. The application of these ideas to the

logic of probability is very fruitful, Ramsey argues, as against the view which I had put forward, that probability is concerned not with objective relations between propositions but (in some sense) with degrees of belief, and he succeeds in showing that the calculus of probabilities simply amounts to a set of rules for ensuring that the system of degrees of belief which we hold shall be a *consistent* system. Thus the calculus of probabilities belongs to formal logic. But the basis of our degrees of belief – or the *a priori* probabilities as they used to be called – is part of our human outfit, perhaps given us merely by natural selection, analogous to our perceptions and our memories rather than to formal logic. So far I yield to Ramsey – I think he is right. But in attempting to distinguish "rational" degrees of belief from belief in general he was not yet, I think, quite successful. It is not getting to the bottom of the principle of induction merely to say that it is a useful mental habit. Yet in attempting to distinguish a "human" logic from formal logic on the one hand and descriptive psychology on the other, Ramsey may have been pointing the way to the next field of study when formal logic has been put into good order and its highly limited scope properly defined. (Keynes, 1933, pp. 300-301)

There are five explicit points to be taken from this passage:

1. Keynes repudiates the analytic project of the *Treatise* to construct a logical theory of probability as a set of objective relations between propositions
2. Keynes accepts Ramsey's pragmatist approach to probability as concerned with degrees of belief
3. Keynes accepts Ramsey's argument that formal logic should be restricted to showing how a consistent system of degrees of belief can be constructed
4. Keynes accepts that the pragmatist approach entails a new field of study of human logic that is distinct from both formal logic and descriptive psychology and is concerned with the basis of degrees of belief
5. Keynes considered Ramsey to have pointed the way towards the importance of human logic but had not yet resolved either how to distinguish rational degrees of belief from belief in general or the problem of induction

In contrast to those Keynesian scholars such as Carabelli and O'Donnell who interpret Keynes's comment that treating induction as a useful mental habit does not get to the bottom of the problem of induction as implying that Keynes continued to reject pragmatism, a more nuanced approach to interpreting Keynes's comment is required. Keynes is rejecting the instrumentalist Jamesian strand of pragmatism that truth is merely what works. Carabelli is right to argue that this is a long-standing criticism of pragmatism that Keynes derived from Ramsey and Moore. But it is also the strand of pragmatism that Peirce and Ramsey rejected. Ramsey's notion of human logic is, as he stated in 'Truth and Probability', the study of the logic of truth, or alternatively, inductive logic. Ramsey never claimed that he had solved the problem of induction by categorising it as a useful mental habit. As Keynes indicates, Ramsey's development of the human logic of truth was work in progress at the time of his death. Indeed, it runs counter to Ramsey's method of analysis to limit the scope of analysis by treating some concepts as beyond analysis, given his criticisms of the Neo-Platonism tendencies in both Moore's concept of the good and Keynes's concept of probability relations.

There is also another point to be taken from the quoted passage by way of what Keynes does not mention in his response to Ramsey's critique of the *Treatise*. It is noteworthy that there is no mention of Ramsey's argument for the betting-quotient method of measurement. This suggests that Keynes did not consider acceptance of the pragmatist approach to probability as necessitating the rejection of his argument for non-numerical probabilities. Ramsey's betting-quotient method shows how a consistent

system of numerically-measurable probabilities can be constructed using the doctrine of mathematical expectation. It is a matter of formal logic not human logic with no indication that Keynes had been persuaded that a numerical calculus of probabilities would be empirically useful in understanding human behaviour.

The final section of the biographical essay consists of two extracts from Ramsey's paper 'Philosophy' (1929A) and an extract from his paper 'Is There Anything To Discuss?' originally presented to the Apostles in 1925 and published as 'Epilogue' in the *Foundations*. The two extracts from 'Philosophy' provide supporting evidence for Ramsey's pragmatist direction of travel particularly the forward-looking nature of meaning and the dangers of scholasticism. The Apostles paper addresses the problem of the increasingly limited space for discussion by interested laypersons of important subjects such as science, history, politics, philosophy and psychology. These subjects have become highly technical with meaningful discussion restricted to experts. Ramsey laments that the technicality of these subjects has reduced the Apostles to comparing how they feel about their experiences rather than discussing why they feel as they do. But the main reason for both Keynes concluding his essay with this extract as well as Braithwaite's choice of this paper to act as the 'Epilogue' in the *Foundations* is likely to have been to leave the reader with a sense of Ramsey's humanity and optimism and some understanding of the profound loss that those close to him felt: 'Humanity, which fills the foreground of my picture, I find interesting and on the whole admirable. I find, just now at least, the world a pleasant and exciting place.' (1931, p. 311)

5. Some concluding thoughts

This paper has focused on re-assessing Ramsey's influence on Keynes. It has been argued that the Standard View has set the parameters of the debate too restrictively in considering only the extent to which Keynes modified his theory of probability as a consequence of Ramsey's criticisms of logical probability-relations and non-numerical probabilities. Building on the work of both Coates and Misak, the Alternative View has been proposed in which Ramsey's influence on Keynes is seen as being principally at the level of philosophy. Specifically, the Alternative View starts with the recognition of Ramsey's adoption of the logical pragmatist philosophy of C. S. Peirce from 1924 onwards with a dispositional theory of belief. Unlike the instrumentalist 'it works' pragmatism of James rejected by Russell, Moore, Keynes, Ramsey and the early Wittgenstein, the logical pragmatism of Peirce and Ramsey treats beliefs not only as useful mental habits that can successfully guide future actions but also as able to provide true explanations of observed empirical facts. As well as the evidence provided by Coates and Misak of Keynes's continued active involvement in philosophical debates in Cambridge in the 1920s and 1930s, the textual evidence, particularly Keynes's 1926 letter to Urban and his 1933 biographical essay on Ramsey (especially Keynes's concentration on the development of Ramsey's pragmatist philosophy in the final years of his life), supports the contention that Keynes fully appreciated, and was sympathetic to, Ramsey's pragmatism, especially the importance of vague knowledge and the need for the development of human logic as the study of reasonable human behaviour.

The interpretation of Keynes's later philosophical thought as moving in a similar pragmatist direction as Ramsey does not necessarily imply a radical change in Keynes's position and may perhaps be better described as evolutionary rather than revolutionary. It calls into question the usefulness of characterising the debate in terms of a

'continuity-or-change?' dichotomy. For example, Carabelli (2021) argues that Keynes's concern with vague knowledge is a continuous theme throughout his life, but this does not preclude an evolution in the understanding of vague knowledge as the philosophical context changed. Likewise, O'Donnell (2021) argues for the continuity of realism in Keynes's thought but recognises that there was a significant change between the metaphysical (Platonic) realism underpinning the *Treatise* and the empirical and analytical realism underpinning the *General Theory*. But the rejection of metaphysical realism while retaining a commitment to analytical and empirical realism is consistent with the logical pragmatism of Peirce and Ramsey. As the context changes, previously-held beliefs evolve to cope with that change. Evolution is a 'both-and' concept, both change and continuity, a matter of degree rather than an either-or dichotomy.

Re-reading the *General Theory* with a logical pragmatist lens offers new possibilities for understanding Keynes's innovative methods of analysis. A Peirce-Ramsey logical pragmatist perspective on Keynes's epistemology would complement the critical realist/Cambridge social ontology perspective on Keynes's ontology (2003). The Peirce-Ramsey pragmatist dispositional theory of belief in which actions are forward-looking with uncertain outcomes, and beliefs are not just psychologically but also epistemologically justified, fits with the emphasis throughout the *General Theory* on behavioural propensities, expectations and uncertainty. Indeed, Keynes's emphasis on the impact of uncertainty on human behaviour could be argued to represent a distinctive contribution to the Peirce-Ramsey-Keynes strand of logical (or realist) pragmatism. Just as Keynes recognised, and was persuaded by, the pragmatist turn in Ramsey's approach to understanding human behaviour, so too should heterodox economists recognise the possibilities of adopting a more explicitly pragmatist approach to further develop a Keynesian understanding of economic behaviour and the fragility of the economic system.

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