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Keynes and Knight on uncertainty: peas in a pod or chalk and cheese?

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For many years, the ideas of Knight and Keynes have been widely understood to overlap greatly and they are presumed to have developed notions of uncertainty that deeply intersect, both describing a state where outcomes have non-probabilistic likelihoods. Furthermore, even their political philosophies are historically somewhat homogenised, both considered 'liberals'. We critically review the historical records and writings of these key scholars with the purpose of dehomogenising their political philosophies, scientific epistemologies and their famous works on uncertainty, published in the same year—1921. We show that neither Keynes nor Knight has been considered fairly by history. Keynes, far from a liberal, was a political socialist who supposed that economic futures could be predicted rationally via deduced probabilities (in an abstract sense) and concluded that expert economists could and should engage in economic planning. Knight, in stark contrast, was something of a radical liberal, holding uncertainty and paradox to be the permeating fact of human existence, which implied, for Knight, significant political and economic complexities far beyond any planner. In short, Knight and Keynes held to radically different philosophic assumptions and, consequently, derived distinctive theories of uncertainty, much further apart than previously supposed. By more fully and accurately placing their ideas within the context of their ideological priors, we gain a stronger sense of how they truly understood the mechanics of economies.

Key words: History of economic thought, John Maynard Keynes, Frank Knight, uncertainty
JEL classifications: B31, D81, P00

1. Introduction

In the year 1921, the centenary of which we celebrate in this special issue, two seminal works appeared by bourgeoning economists: John Maynard Keynes and Frank H. Knight. Keynes, a budding mathematician, published his dissertation—a treatise on probability theory—which Bertrand Russell (1922, 119) would describe as 'the most important work on probability that has appeared for a very long time'. In that same year, Knight also published a revised and elaborated version of his dissertation, which

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developed the economics of uncertainty and of judgement. These authors and their seminal works would later be elaborated into distinguished 'schools' of economics, the Keynesian school of macroeconomics (Snowdon and Vane, 2005; Faccarello and Kurz, 2016) and the 'Chicago school' of microeconomics (Emmett, 2009).

These economic schools and the theories that underpin them are, of course, very different. Among the various differences between Keynes's and Knight's economics and, arguably, fundamental to them is their distinctive concepts of *uncertainty*. For both, uncertainty underpinned the mechanics of economies, which their later works (Keynes, 1936; Knight, 2009) would elaborate. Many today have concluded that Keynes's and Knight's uncertainty concepts are functionally similar, due to the strong resemblance in how they invoke the notion of non-probabilistic estimates (e.g. Weisman, 1984; Williams and Findlay, 1986; Hodgson, 2011; Arthmar and Brady, 2016). Still, this is curious considering how different their respective economic theories are.

Although there are interesting similarities between their uncertainty concepts, there are also fundamental differences from which they drew very different conclusions, including what uncertainty entails and how it can (or should) be dealt with. While there have been several comparisons and contrasts made of Knight's and Keynes's uncertainty concepts (e.g. Lawson, 1988; Greer, 2000; Davidson, 2010), we argue that these have lacked sufficient contextualisation to illuminate their fundamental differences. We hold that a fuller picture requires closer examination of the philosophical priors on which these scholars built their respective works. Their philosophical differences also provide important insight into their ideas about the nature of economy, indicating why their views on the economy are different and, thus, the setting in which uncertainty plays a role. As O'Donnell (1989, 1–2) comments (about Keynes specifically), 'to comprehend the political-economist adequately, we must first understand the philosopher'.

Herein we examine the political and scientific philosophies of Keynes and Knight to elucidate the nature of uncertainty that they individually understood. Both subscribed to very different political views stemming, in part, from their distinctive upbringings (Greer, 2000), which greatly influenced their economic thinking (Gordon, 1974; Gonce, 1992; Skidelsky, 1992; O'Donnell, 1999; Fuller, 2019B). Knight was 'a "liberal" (in the midnineteenth-century meaning of that term)' (Gordon, 1974, 571) who valued economic freedom *per se* as a fundamental ethical value. Keynes, on the other hand, characterised himself as a 'liberal socialist' (O'Donnell, 1999), which, while some have disputed the label (e.g. Skidelsky, 2010), appears to be apropos (Fuller, 2019B). These political differences, which remained largely (but not fully) consistent throughout their careers, suggest how Keynes and Knight differed in their respective understandings of the market economy. Consequently, they differed also in what institutions they thought the economy might require, which reconnects with their politics and completes the circle.

We acknowledge that our historical review of Keynes is unconventional and may be somewhat contentious. However, in following new historical work (O'Donnell, 1999; Fuller, 2019A, 2019B; Magness and Harrigan, 2020; Terra *et al.*, 2020) as well as our own careful reading of Keynes's own writings, unmoored of standard interpretations, we believe our conclusions to be correct; we are confident that they are, at least, defensible as a plausible interpretation. Keynes was a complex thinker whose views evolved somewhat over the years, and whose academic writings were written to and for

academic fields of different ideological persuasions, which has allowed for alternative interpretations. However, by following their contemporaneous personal, political and academic writings, we attempt to reconstruct both Keynes's and Knight's underlying thinking and intended meanings, which we will show to be, in both cases, more radical and interesting than has been widely portrayed.

2. John Maynard Keynes

Keynes's *magnum opus*, *The General Theory of Employment, Interest and Money* (*GT*) was prominent in ushering in modern thought on macroeconomics and remains a foundational text. The economics of uncertainty in Chapter 12 has received particular acclaim. His much earlier *Treatise on Probability* (*TP*) was less celebrated, but far more comprehensive (albeit less explicit) in its treatment of economic uncertainty. More recent efforts have attempted to unpack Keynes's theory of uncertainty, paying special heed to the foundations laid in *TP* (e.g. Lawson, 1985, 1988; Davidson, 1991). However, these interpretations derive from what we conclude to be a misleading history and caricatured worldview from which Keynes supposedly developed his theories. A deeper look into his ideology over time engenders rather different interpretations.

2.1. Keynes's political philosophy

While economic historians have traditionally placed Keynes within the tradition of liberal economists (e.g. Skidelsky, 1992, 2000, 2010), compelling new historical scholarship suggests that Keynes considered himself a non-Marxist socialist (O'Donnell, 1999; Fuller, 2019B). The historical confusion appears to stem from Harrod's (1951) biography, in which he 'deradicalized Keynes and portrayed him as a "conventional" liberal economist' (Fuller, 2019B, 1654) in an effort to protect Keynes's legacy amid the highly anti-socialist sentiment of Harrod's day. The biography was 'an exercise in covering up and planting false trails' (Skidelsky, 1983, xxiv–v). The attribution of liberalism is also buoyed by the fact that Keynes regularly criticised certain socialist and communist movements and had, at times, actively electioneered for the British Liberal Party, and was even approached for candidacy (which he refused) (O'Donnell, 1999).

However, a review of Keynes's personal and professional writings shows that Keynes was converted to socialist ideology in his college years and remained so until the end of his life (O'Donnell, 1999; Fuller, 2019A, 2019B). This conversion appears to have begun by 1907 at the hand of George Bernard Shaw,[1] and Keynes became an early member of the Fabian Society at Cambridge University. Ten years later, he cheered the Bolshevik revolution, remarking that 'the only course open to me is to be buoyantly bolshevik' (Keynes, 1971, vol. XVI: 266). He married a socialist in 1925 and honeymooned in her native Russia (Mackrell, 2008). While Skidelsky (1992, 236) claims that, by 1928, Keynes's 'romance' with bolshevism was 'clearly over', it becomes clear in his *Essays on Persuasion* that Keynes's rejection of the Bolshevik movement at this time was not because of its ideology but due to its classism. Bolshevism represented 'the first confused stirrings of a great religion' (Keynes, 1931, 309), but 'exalt[ed] the boorish proletariat above the bourgeois and the intelligentsia who, with whatever

[1] In a letter to Lytton Strachey, dated 25 October 1907, Keynes wrote, 'Mr. Bernard Shaw converted us all to socialism last night'.

faults, are the quality in life and surely carry the seeds of all human advancement' (300). He similarly admits to aligning ideologically with the socialist Labour Party of contemporaneous Britain, but again could not join them because they advocated a class takeover—'and [their] class is not my class…the *Class* war will find me on the side of the educated *bourgeoisie*' (Keynes, 1931, 324)—and not for their socialism (O'Donnell, 1999). In *GT*, Keynes clearly steps away from his socialist ideology in addressing a predominantly liberal economics profession. Yet, even in that work he displays his clear socialist proclivities,[2] such as calls for technocratic 'central controls' and State planning (Terra *et al.*, 2020). By 1939, Keynes's had landed upon and given name to his political ideology—'liberal socialism'—which he espoused until his death in 1946:

> The question is whether we are prepared to move out of the nineteenth century *laissez-faire* state into an era of liberal socialism, by which I mean a system where we can act as an organized community for common purposes and to promote social and economic justice, whilst respecting and protecting the individual—his freedom of choice, his faith, his mind and its expression, his enterprise and his property. (Keynes, 1971, vol. XXI: 500)

2.2. Keynes's ethics and epistemology

Keynes's socialist ideology, which became tempered and pragmatic over time but which he never abandoned, played a visible role in his academic work. His first academic interests concerned the overlap of moral ethics and probability theory, inspired by his training in mathematics and his socialist ideology (Fitzgibbons, 1988). In particular, he was interested in the knowability of future consequences of actions and, thus, the ethical disposition of one's choice of actions.

Moore's *Principia Ethica*—in which Moore argues against Locke's (1689) concept of 'natural law', putting forth instead a consequentialist view of rule-following based in uncertain causal knowledge—became 'the most important book in [Keynes's] life' (Skidelsky, 1983, 119). Moore argued that, even though there may be cases where following an institutional rule would prove suboptimal, 'we can never know which those cases are, and ought, therefore, never to break it' (Moore, 1951, 162–3). Institutions or rules, to Moore, solve the uncertainty problem of action: by instituting universal rules of behaviour, with which all actors are expected to comply, actors' choices can be aligned towards beneficial ends. Similar to the Kantian deontological ethic, with the categorical imperative that it is the actor's duty to act in accordance with a maxim that one could support as universal law, the assumption is that, under causal uncertainty, the consistent application of *any* reasonable rule of behaviour would increase predictability and thereby facilitate effectuating the intended outcome. As a result, abstract rule-following, as with North (1990), leads to a general reduction in uncertainty through convergent expectations (and behaviour).

Keynes, however, came to a very different conclusion, supposing that outcomes were, in fact, rationally predictable (although not perfectly knowable) with sufficient causal knowledge of how such outcomes arise. Thus, institutional rules often do *not* cause the best possible action in any particular circumstance and so should not be followed: 'What we ought to do is a matter of circumstance; metaphysically we can

[2] The final chapter of *GT* was originally to be entitled 'Socialism' (Keynes, 1971, vol. XXIX, 50).

give no rules' (Keynes, 1905, quoted in Fuller, 2019A, 141). Keynes argued for an 'immoralist' social ethic on the basis that no institutional rule could be justified given the circumstantiality of all cases. Instead, predictive rationality should be followed. Institutions were, thus, comparatively inefficient, an archaic social system for a less enlightened or capable generation that did not yet have the wherewithal to predict outcomes. An elitist (O'Donnell, 1999; Fuller, 2019B; Magness and Harrigan, 2020), Keynes supposed that society could be much more efficient were it to allow expert technocrats to make rational social and economic decisions rather than relying on inefficient institutional rules.

This ethical argument regarding the moral obligation (or not) toward rule-following inspired his dissertation, accepted in 1909 and published as *A Treatise on Probability* in 1921. In this work, Keynes observed that Moore's conclusions were based on a frequentist theory of probability, in which probabilities are based only in a sufficient number of repeated, uniform (class) observations (cf. Mises, 1939). Per frequentism, specific 'case' probabilities not belonging to an established 'class' of events are unknowable *ex ante*. For Moore, Keynes realised, optimisation of human action requires following an institutionalised class of actions to avoid the uncertainties of case-type actions.

Keynes argued, contra frequentism, that we can derive probabilities not only statistically (*a posteriori*) but also *logically* (*a priori*). Of the two, Keynes held that *a posteriori* probabilities, calculated based on an examination of measurable phenomena, are inherently unreliable: 'calculating the relative importance of these measurable factors essentially depends on the assumption that between them they are comprehensive' (Keynes, 1939, 561). Such an assumption 'withdraws from the operation of the method all those economic problems where political, social and psychological factors, including such things as government policy, the progress of invention and the state of expectation, may be significant'. More reliable are logical probabilities,[3] which, if the underlying 'probability-relations' are known, can be applied even to 'case' events with no precedent. It follows that a generic institutional rule of behaviour, which must be assumed relevant and beneficial over time despite the consistently unique circumstances of action, should lead to less beneficial outcomes, generally, than if actions were taken in accordance with the predictive probabilities, which would improve over time with growing scientific knowledge. Consequently, the behavioural uncertainty that underpinned Moore's rule-based ethic is undermined in Keynes's view, and can be replaced with rational immoralism. Whenever the rule of behaviour is not in line with predictive (*a priori*) utility maximisation calculus, there is no reason to follow the suboptimal rule.

As a consequence, while most historians label Keynes an empiricist due to the fact that the bulk of knowledge (or 'evidence') required for rational prediction is experientially acquired, we agree with O'Donnell's (1989, 81) characterisation of Keynes as 'a particular kind of rationalist'. This conclusion is drawn from Keynes's theory of logic and probabilities, in which the probabilities of all outcomes can be assessed logically

[3] Keynes explicitly defines *a priori* probability as the probability of the argument where the weight (total evidence) is at its lowest, i.e. where only intuitive and no empirical evidence exists. We use *a priori* herein in the primary meaning of rationalist philosophy—that which can be logically deduced *a priori*. To distinguish this from Keynes's terminology, then, we use *logical probability* to reference a probabilistic prediction prior to or absent frequency data.

(*a priori*) from one's 'direct knowledge'[4] of probability-relations. Thus, all action, even in the face of uncertainty, can be calculated, and can be improved with superior reasoning capabilities. There is, consequently, a rationally best course of action, objectively[5] determinable, in any choice situation. This is not to say that all actors are rational—many actors act irrationally, which he concludes might be curtailed with greater deference to more rational experts. Keynes also acknowledges uncertainty, which we shall elaborate shortly hereafter. This uncertainty was, for Keynes, an epistemic boundary and prevented only certain foreknowledge and not probabilistic prediction.

2.3. Keynes's probability theory

Keynes observes two types of knowledge: direct and indirect. *Direct* knowledge is given forthwith from experience and includes 'experience, understanding, and perception' (Keynes, 1921, 12). One category of direct knowledge is the logical relationships between propositions—their 'probability-relations'.

> Let our premisses consist of any set of propositions h, and our conclusion consist of any set of propositions a, then, if a knowledge of h justifies a rational belief in a of degree α, we say that there is a probability-relation of degree α between a and h (Keynes, 1921, 3).

The second type of knowledge, *indirect* knowledge, is inferred logically from directly known probability-relations. 'When we know something by argument this must be through direct acquaintance with some logical relation between the conclusion and premiss' (Keynes, 1921, 15).

Extending this logical relations approach to probabilities, Keynes further posits that not all relations, and thus not all probabilities, can be measured numerically, a major problem for *a posteriori* statistical inference. Keynes thus calls into question ('how can this be done?') the suggestion that 'the method can be usefully applied if *some* of the factors are measurable' (Keynes, 1939, 561). He supposes *three* relation types between different premise-conclusion propositions: (i) where no comparison can be made whatsoever; (ii) where one is greater (more likely) than the other but with no possible way to measure magnitude; and (iii) where it is possible to numerically compare the magnitudes of the relations (Keynes, 1921, 36–7). This third type is burdened by essentially the same problem as *a posteriori* probabilistic inference—knowing *all* factors is required to calculate relative importance. Keynes notes that this type has gained scholarly attention 'out of proportion to their real importance… on account of the opportunities of mathematical manipulation which they afford' (Keynes, 1921, 40). In fact, Keynes holds that most probabilities are actually of the first or second type.

[4] While 'knowledge' is today generally defined as 'justified true belief', Keynes does not appear to define knowledge (as in 'direct knowledge') as necessarily true, but only as reasonably justifiable.

[5] 'All propositions are true or false, but the knowledge we have of them depends on our circumstances; and while it is often convenient to speak of propositions as certain or probable, this expresses strictly a relationship in which they stand to a corpus of knowledge, actual or hypothetical, and not a characteristic of the propositions in themselves. A proposition is capable at the same time of varying degrees of this relationship, depending upon the knowledge to which it is related, so that it is without significance to call a proposition probable unless we specify the knowledge to which we are relating it. To this extent, therefore, probability may be called subjective. But in the sense important to logic, probability is not subjective. It is not, that is to say, subject to human caprice. A proposition is not probable because we think it so. When once the facts are given which determine our knowledge, what is probable or improbable in these circumstances has been fixed objectively, and is independent of our opinion' (*TP*: 2–3).

Probabilities of the second type can be ordinally ranked and compared. Probabilities of the first type comprise 'the probabilities of arguments dissimilar in form and incapable of schematic reduction' (Keynes, 1921, 74).

Unfortunately, Keynes does not expand much on the first type (but see Keynes, 1921, 31–8), which is of primal interest to us here. However, he maintained that even such incomparable types are still *probabilities*,[6] in an abstract sense, and can thus be employed in *ex ante* judgements:

> We must bear in mind that our theory must apply to all probabilities and not to a limited class only, and that, as we do not adopt a definition of probability which presupposes its numerical mensurability, we cannot directly argue from differences in degree to a numerical measurement of these differences. (Keynes, 1921, 36–7).

Said differently, one of Keynes's primary contributions, perhaps his most important, was to erect a probability logic that would work for immensurable probabilities as well as the mensurable ones that pervaded contemporary mathematics. Keynes's goal was not to show the boundaries of probabilistic expectation but to expand them to include the vast number of cases where 'there is no scientific basis on which to form any calculable probability whatever' (Keynes, 1937, 214).

Another key factor for prediction in Keynes's framework is the *weight* of arguments, i.e., the absolute amount of relevant[7] evidence. Keynes was unsure of the weight (so to speak) to attach to this weight construct (see Keynes, 1921, 78, 84), but he clearly distinguished it as an independent property of an argument different from effects of the content of the evidence (i.e. probability-relations). In short, the rational actor favours those arguments' probabilities that have the most evidence, *ceteris paribus*. In such cases of probabilistic incomparability, then, the judgement may be settled based on the weight of the evidence.

Although one can be fully rational in any situation based on *ex ante* probabilities, this does not imply that such behaviour is necessarily *right*. '[A] man may rationally believe a proposition to be probable, which it is in fact false' (Keynes, 1921, 9). For *certain* knowledge, 'it is necessary that one of two conditions should be fulfilled—(i) that we know p directly; or (ii) that we know a set of propositions h, and also know some secondary proposition q asserting a certainty-relation between p and h' (Keynes, 1921, 16). When these conditions remain unmet, uncertainty is the result.

2.4. Keynesian uncertainty

Keynes did not lay out an explicit theory of uncertainty, as did Knight. That he recognised uncertainty in his probability and economics work is, however, indisputable, and

[6] Keynes adopts a definition of 'probability' that is broader than the prevailing mathematical view. He states on pp. 35–36 of *TP*: 'I aim here at dealing with probability in its widest sense, and am averse to confining its scope to a limited type of argument. If the opinion that not all probabilities can be measured seems paradoxical, it may be due to this divergence from a usage which the reader may expect. Common usage, even if it involves, as a rule, a flavour of numerical measurement, does not consistently exclude those probabilities which are incapable of it. The confused attempts, which have been made, to deal with numerically indeterminate probabilities under the title of unknown probabilities, show how difficult it is to confine the discussion within the intended limits, if the original definition is too narrow'.

[7] Keynes defines (ir)relevance strictly: 'h_1 is irrelevant to x on evidence h, if there is no proposition, inferrible from h_1h but not from h, such that its addition to evidence h affects the probability of x' (*TP*: 60). Thus, 'to say that a new piece of evidence is "relevant" is the same thing as to say that it increases the "weight" of the argument' (*TP*: 79).

many attribute to Keynes the introduction of uncertainty into economic analysis (although Keynes (1971, vol. XIII: 602) admits only to having 'put more precisely what is implicit in most contemporary economics'). Keynes himself considered his introduction of uncertainty into economic analysis to be 'more of an innovation than any other aspect of the *General Theory*' (Patinkin and Leith, 1977, 160). However, Keynes's writings on uncertainty are rather fragmented, and scholars have tried to reconstruct from those pieces a more formal theory of uncertainty.

Lawson (1985, 1988) gives us perhaps the best distillation of Keynes's own theory of uncertainty. However, his interpretation, while plausible, seems to us rather Whiggish in elaborating various incidental insights that either could not or would not be elaborated in Keynes's own work. The result is an uncertainty theory highly similar to that of Knight (reviewed below)—so much so that some have called it the Knight-Keynes uncertainty concept (e.g. Davidson, 1972; Hodgson, 2011). This interpretation is thrown into question, however, once we replace the interpretive lens of a liberal worldview with that of a socialist worldview underpinned by a rational immoralist ethic, as reviewed previously. Specifically, a more complete elaboration of such ideas as those cases where 'there is no probability at all' (Keynes, 1921, 35) through the lens of philosophical liberalism and empiricism, as Lawson pursues, would have left Keynes in the same place as Moore (1951)—in the case of (Knightian) uncertainty, we could not know when a rule could rationally be disobeyed and, so, should always follow the rule—and, thus, would have undermined Keynes's arguments for immoralism and his political ideals.

While Keynes explicitly observes the possibility of uncertainty where 'there is no scientific basis on which to form any *calculable* probability whatever' (Keynes, 1937, 214, emphasis added), we must recall that he distinguishes measurable and immeasurable probabilities, and constructs his rational expectation logic for *both*. Indeed, the distinction between these is, in *TP*, mostly just 'a matter of definition' as 'the distinction between probabilities, which would be thus measurable and those which would not, is not fundamental' (Keynes, 1921, 35). Modern interpretations that read into Keynes some utter unpredictability due to uncertainty thus appear to be mistaken, running afoul of Keynes's philosophic paradigm.

The problem of uncertainty, for Keynes, is in what Shackle (1983) would dub 'unknowledge', that is, in a lack of the perfect knowledge required to predict a necessarily true outcome. We could know *about* possible outcomes and rationally expect a particular one. However, we could not *know* with certainty the outcome-to-come. In Keynes's (1921, 14–5) words:

> The peculiarity of certainty is that knowledge of a secondary proposition involving certainty, together with knowledge of what stands in this secondary proposition in the position of evidence leads to *knowledge of*, and not merely *about*, the corresponding primary proposition. Knowledge, on the other hand, of a secondary proposition involving a degree of probability lower than certainty, together with knowledge of the premiss of the secondary proposition, leads only to a *rational belief of the appropriate degree* in the primary proposition. The knowledge present in this latter case I have called knowledge *about* the primary proposition or conclusion of the argument, as distinct from knowledge *of* it.

Keynes concludes, according to Lawson, that this situation of 'unknowledge' regarding the probability-relation between some propositions casts the propositions into uncertainty—it is 'a situation in which there is a lack of certainty' (Lawson, 1985, 914). This uncertainty would arise when probability-relations cannot be numerically determined

or compared. Explicit and known probabilities would not render uncertainty but mere improbabilities. 'By "uncertain" knowledge, let me explain, I do not mean merely to distinguish what is knowledge for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty' (Keynes, 1937, 213).

What, perhaps, Lawson misses or disregards, however, is that Keynes explicitly advances the argument that all behaviour is based in probabilistic reason, albeit imperfect, thereby making rational behaviour subject to the decision-maker's accumulated knowledge and ability to reason about probabilities. For Keynes, all propositions are probabilistic, and can be rendered as such. The matter of uncertainty, then, is merely whether one *knows* and rationally employs those probabilities. Keynes's uncertainty, the absence of sufficient evidence to predictively determine outcome probabilities *a priori*, has often been labelled 'ambiguity' (Ellsberg, 1961; Dequech, 2000; Packard *et al.*, 2017), where the probabilities of outcomes exist, but are unknown.

While the Keynesian notion of uncertainty continues to prevail among the economics profession, recent uncertainty theorising, which supposes non-probabilistic reasoning to be the essence of judgement, has begun to move away from the Keynesian notion of uncertainty (and toward the Knightian notion). In fact, a more faithful reading of Keynes puts his notion of uncertainty closer to probabilistic uncertainty concepts of Savage (1954) and de Finetti (1931) than to Knight (1921),[8] although Keynes is careful to observe, contra Savage, that subjective probabilities are not typically numerical and, so, cannot be fitted neatly into an expected utility calculus.

> About these matters [of uncertainty] there is no scientific basis on which to form any calculable probability whatever. We simply do not know. Nevertheless, the necessity for action and for decision compels us as practical men to do our best to overlook this awkward fact and to behave exactly as we should if we had behind us a good Benthamite calculation of a series of prospective advantages and disadvantages, each multiplied by its appropriate probability, waiting to be summed. (Keynes, 1937, 214).

While the first part of this quote is often referenced as evidence of Keynes's similarities to Knight, the latter part of it is typically overlooked, which posits that, while actors often cannot know the precise probabilities of outcomes, and quite often cannot ascribe numerical values to such probabilities due to procedural limitations, *rational* action demands a probability-based judgement and, so, rational actors generate non-numerical probability rankings from the evidence available, from which judgement can be made. Note that Keynes also theorised somewhat about the *ir*rational actor, who acts not according to such probability judgements but, instead, to their instinctive 'animal spirits'. An implication of this position is that all *rational* behaviour is superior to *irrational* behaviour and that rational behaviours, subject to probability reasoning, can be deemed objectively better or worse (and perhaps good or bad) *ex ante*. Again, this is key to his immoralist ethic.

[8] Savage (1954) seems to clearly (though not explicitly) reference Knightian uncertainty in his exposition of subjective utility in uncertainty (Chapter 2). However, the popularised notion of Knightian uncertainty that Savage deals with is, by this time, already reduced to mere 'ambiguity' of knowable probabilities and not the pure uncertainty of Knight's original work. Savage and the empiricist econometricians certainly disagreed with Keynes's rationalist view of objective *ex ante* probabilities. But here their disagreements largely end. Keynes's *General Theory* was clearly more aligned with, and won the support of, econometricians' economic modelling than was Knight, who rejected probability theory as a foundation for economics (at least, in his 1921 treatise).

Keynes's uncertainty, then, is wholly *epistemic*—that is, all uncertainty is derived from epistemic limitations (cf. Packard and Clark, 2020), i.e., a lack of sufficient evidence. All outcomes are probabilistic, which probabilities are given in the logical relationship between cause and effect. Thus, uncertainty arises out of procedural ignorance of these knowable (albeit often non-numeric) probabilities (cf. Dosi and Egidi, 1991).

> To say…that a probability is unknown ought to mean that it is unknown to us through our lack of skill in arguing from given evidence. The evidence itself justifies a certain degree of knowledge, but the weakness of our reasoning power prevents our knowing what this degree is (Keynes, 1921, 34).

As a final comment, it is unclear from Keynes's account of uncertainty what to make of those situational conditions where probabilities are given and known, yet unlikely. Keynes clearly depicts such situations as *improbable* but not *uncertain*. However, if, as Coddington (1982) suggests and Lawson (1985) agrees, Keynesian uncertainty refers to a lack of certainty, then there is confusion here over how improbable outcomes are *not* uncertain. For surely an improbable outcome, despite one's full knowing of the probabilities, is not certain one way or the other. Such conditions are much better dealt with by Knight, to whom we now turn.

3. Frank Hyneman Knight

Frank Knight is best known for his theorising on uncertainty in *Risk, Uncertainty, and Profit* (*RUP*), a book that explains economic profits and how entrepreneurs, in seeking profits, form business firms. However, this theory of uncertainty has been widely interpreted independent of his personal philosophy, which we fear has led to an incomplete, or perhaps even incorrect, understanding of his uncertainty concept (or concepts). Various efforts have been made to better distil Knight's meaning of uncertainty (e.g. LeRoy and Singell, 1987; Langlois and Cosgel, 1993; Runde, 1998; Hoppe, 2007; Davidson, 2010; Jarvis, 2010). But, we again argue, these also have missed some or much of the complexity of the author's worldview and are, thus, somewhat simplistic reflections of Knight's deep theorising.

Early interpretations of Knight's work were made through a positivist lens, which is decidedly not Knight's own (Langlois and Cosgel, 1993). Economists—quickly turning to econometrics—interpreted Knight's classic distinction between risk and uncertainty to be thus: *risk* refers to situations 'where probabilities are known' and *uncertainty* references those 'where they are unknown' (Zeckhauser, 1986, S441). Thus, with the subjective probability frameworks of Savage (1954) and Arrow (1965), 'uncertainty' (or, often, 'ambiguity'; Ellsberg, 1961) could be reduced to 'risk' for all analytical intents and purposes. Friedman (2007, 282) expressed this view clearly:

> In his seminal work, Frank Knight drew a sharp distinction between *risk*, as referring to events subject to a known or knowable probability distribution and *uncertainty*, as referring to events for which it was not possible to specify numerical probabilities. I have not referred to this distinction because I do not believe it is valid. I follow L. J. Savage in his view of *personal probability*, which denies any valid distinction along these lines. We may treat people as if they assigned numerical probabilities to every conceivable event.

This 'epistemic' interpretation of Knight's uncertainty concept is not only compatible with but even supports formal and positive economic analysis, which Knight rather

vocally opposed. Such treatments of Knight's uncertainty are still common today within the neoclassical mainstream of economics, as well as much of the behavioural stream.

Some have proffered more careful analyses of Knight's theory, yet still through the lens of positivism, characterising the distinction between risk and uncertainty as 'situations in which insurance markets do exist and…situations in which they do not', respectively (LeRoy and Singell, 1987, 396). Yet, still this misses the mark, again not meeting Knight on his own terms.

Langlois and Cosgel (1993, 458) get much closer to a fair reading of Knight, attempting 'to understand him in terms of his own categories of thought' rather than 'through the lens of modern-day theory'. According to their analysis, Knight (1921, 199) sees uncertainty as being derived from one's state of 'partial knowledge', which has less to do with what probabilities can and ought to be attached to specific outcomes and much more to do with a lack of a 'valid basis of any kind for classifying instances' (225). Scholars adopting this reading observe in Knight's theory *two* distinct estimates: an 'estimate' and an 'estimate of an estimate' (Knight, 1921, 227). That is, judgement comprises both (i) an intuitive judgement of what possibilities there may be and (ii) a judgement of the probabilities of those. While economists have traditionally attended to the latter, this interpretation suggests that it is the former that underlies Knight's true concept of uncertainty.

Even this analysis, however, is not completely faithful to Knight's foundational epistemology, which we shall review. Here we offer a new interpretation, one rooted in Knight's radical Scepticism.

3.1. Knight's political philosophy

Knight took a rather similar route to economics as did Keynes, starting his academic journey in philosophy and, particularly, ethics before turning to their politico-economic application. However, unlike Keynes, most historians see Knight's political thought as a clear conclusion from his philosophy and economics, and not the other way around. This philosophical inquiry would keep Knight up at night (so to speak), and ultimately led him to advocate a 'modern liberalism' (Gordon, 1974; Gonce, 1992) or what Burgin (2009) calls a 'radical conservatism'.

Knight (1925, 255) was a pluralist, rejecting both monist realism and idealism. Humankind has a pluralistic nature, full of paradox. He rejected the deterministic hedonism of the day, which depicted the economic actor as 'a mechanical agent, merely responding to external stimuli' (Asso and Fiorito, 2008, 74), in favour of voluntarism and a belief, albeit perhaps limited, in free will (Knight, 1925, 1943A, 1943B). Human actors are unique individuals, with a 'personal self' (Knight, 1947, 442) that innately seeks 'self-realisation', wanting to 'explore, experiment, discover its own ends, choose its own means, endlessly discover and realise its own particular set of latent talents, and develop these talents toward its own emerging, evolving conception of a state of balance' (Gonce, 1992, 816). Humans crave both freedom and power (which Knight combines into a single, 'effective freedom' concept) in their quest for self-determination. As a result, Knight espoused liberal values in both society and the economy, although he 'remained convinced that an excess of liberal freedoms would collapse upon itself' (Burgin, 2009, 536).

For Knight, social conflict arises out of this quest for power toward self-realisation, driving actors to pursue power not just 'over the objects of nature but over other

men' (Knight, 1947, 364). This led Knight to a dour pessimism, a fear of inevitable power imbalances, as the talented gain greater power than the untalented, which power would then be leveraged to beget more power. Such power inequalities would, Knight concluded, inevitably be abused, resulting in oppression and the suppression of others' freedoms. He was thus a 'liberal appalled by the effects of laissez-faire' (Burgin, 2009, 537).

Knight (1943A) concluded that the surmounting of these conflicts and paradoxes, to the extent that they can be overcome, is wrought by setting up political institutions to curtail power abuses and to maximise freedoms. Such institutions should be specifically aimed at ensuring that one's behaviour, first and foremost, would cause no harm to others, and, second, would converge toward contributing to social utility. While limiting, the intent of institutions is to guarantee individuals' equal right to freedom not only in the present but also in the longer term. However, the pursuit of freedom and, ultimately truth[9] and self-realisation, 'was intimately connected in his thought with a number of other issues that are equally fundamental' (Gordon, 1974, 572). Principle among these 'other issues', which underpinned them all, was *uncertainty*.

3.2. Knight's epistemology

Some have characterised Knight's epistemology as American pragmatist (e.g. Hands, 2006; Fiorito, 2009), which is perhaps fair. As far as we know, Knight never explicitly labelled his own epistemology (although he expressed sympathies with William James's 'radical empiricism' at least once [Knight, 1929, 146])—in fact, according to one of his colleagues, Knight 'disliked labels' (Gordon, 1974, 576). However, Knight was mostly a critic of what he considered epistemological incompetence, which he believed to pervade economic thought. His Scepticism would go so far as to include his own work—for example, he begins *The Economic Organization* with 'a warning against attaching too much importance to [the book]' (Knight, 2013, 3). And though an economist, he was convinced 'that in the ultimate and essential problem the economic factor is relatively superficial and unimportant' (Knight, 1999, 83). He was nevertheless especially hostile to the scientific positivism that came into vogue within the economics discipline during his tenure, describing positivists as 'simply bad metaphysicians' (Knight, 1940, 3).

> The fundamental propositions and definitions of economics are neither observed nor inferred from observation in anything like the sense of the generalizations of the positive natural sciences, or of mathematics, and yet they are in no real sense arbitrary. They state 'facts', truths about 'reality'—analytical and hence partial truths about 'mental' reality, of course—or else they are really 'false'. Economics and other social sciences deal with knowledge and truth of a different category from that of the natural sciences, truth which is related to sense observation—and ultimately even to logic—in a very different way from that arrived at by the methodology of natural science. But it is still knowledge about reality (Knight, 1940, 5–6).

The principal problem with positive economics, for Knight, concerned its reduction of social phenomena to deterministic and observable entities ripe for empirical study

[9] 'The core of liberalism—what most distinguishes it from other views of life—is a manifold revolution in the conception of truth.... To say that belief is free is to say that truth is inherently "dynamic", subject to change and actually growing and changing. The liberal interest in truth is one of curiosity and quest, not of mystical contemplation or adoration.... Truth is an end when it is unknown or uncertain, and specially if controversial; hence the truth interest is finally a romantic one' (Knight, 1947, 394).

and modelling. He thus had, as Reder (1982, 6) put it, an 'outspoken disdain for empirical, especially quantitative, research' in the social sciences, including economics. He recognised that social actors, who deal with an inescapable dilemma in natural uncertainty, are not innately predictable. Because of this uncertainty, there can be no objective truth or true knowledge in the social realm. Knight rejects these in favour of a more radically subjectivist notion of truth—one that is evolutionary and individually dependent—much like postmodern thinkers have concluded (e.g. Lyotard, 1984; Rorty, 2009).

Knight was also sceptical of rationalism, supposing deduced logical proofs to be of limited application to empirical reality. He rejected all reductionist theories as well as any deontological value statements. Social reality, to Knight, is not so simple as to permit simple scientific explanation, but in fact is fraught with irreducible complexities and paradoxes. The best we can do is to effect prudent polity and institutional rules designed to constrain and curtail imbalanced powers and their exploitation to thereby facilitate each person's self-determination.

Again, for Knight, the fundamental principle of a social scientific epistemology is *uncertainty*. Thus, he was very sceptical of social '"science" with a capital *S* (if they do not always write it that way)' (Knight, 1940, 1), which is far removed from pursuing such immutable truths as the laws of nature in the natural sciences. The realm of social science, and of human experience generally, is one of incessant uncertainty. In fact, to Knight it is *because* of such uncertainty that humankind is free, for in its absence we would become deterministic automata, unable to 'decide' or 'value' or even 'think', since optimal behaviour would be a mere calculated reaction. Thus, for Knight, 'man is a free and thinking being because of uncertainty, yet it is uncertainty which imposes limits upon his effective use of reason, a complexity that is compounded by the fact that we are uncertain also to the limits of uncertainty' (Gordon, 1974, 572).

3.3. Knightian uncertainty

Whereas Keynes's theory of uncertainty was, at best, informally implied, Knight sought to lay out a clear and explicit theory of uncertainty, the centrepiece of his theory of economic judgement and organising. Turning to economic problems from his interests in philosophy, Knight's *RUP* was a remarkably profound first foray into the field. As Runde (1998, 539) put it, '[n]ot only is his categorisation of different kinds of "probability situation" a good deal more subtle than the simple risk/uncertainty dichotomy might imply; he also has many interesting things to say about induction, social "laws", the metaphysics of chance and the psychology of decision-making under uncertainty'.

Scholars have been wont to ascribe the label 'Knightian uncertainty' to a *context* or *situation*, especially an economic environment in which the economic agent must make judgement from mere probability 'estimates'. Miller's (2012, 60) view is common:

> Knightian uncertainty goes to objective unknowability, existing in the environment, about potential outcomes and the probability distributions on possible outcomes from actions: these are not knowable ex ante. This is distinct from other forms of uncertainty discussed in the management literature, such as 'perceived uncertainty' (Milliken, 1987) or 'adopter-specific uncertainty' (Rogers, 2010), which are both a quality of the individual undertaking an action. These alternative conceptualizations of uncertainty do not address the potential, ex ante, understandability of outcomes and probability distributions.

But let us consider Knight's own words in *RUP*:

> The fact that prediction may involve costs, and likewise the organization for grouping risks and eliminating *their* uncertainty, does not negate the truth of the proposition, so long as these costs are given elements in the competitive situation. (47–8, emphasis added)
>
> So long as we adhere to the fundamental condition already emphasized, that men *know exactly what they are doing*, that no uncertainty is present, other elements of reality hitherto abstracted merely complicate the process of adjustment without changing the character of the result. (p. 94, emphasis in original)
>
> It is mainly the presence of the risk or uncertainty factor which makes such a separation desirable. In a progressive society some motives for specializing to individuals other than the savers the function of making the investment might exist even in the absence of uncertainty. *In the society which we have described with both uncertainty* and progress absent, there would be no motive for lending or borrowing value funds for the purchase of productive agencies. (p. 140, emphasis added)
>
> Part Three of the essay will be devoted to a discussion of the meaning and consequences of uncertainty, *the incompleteness and inaccuracy of the beliefs and opinions* upon which economic conduct is based. (175, emphasis added)
>
> It is a world of change in which we live, and a world of uncertainty. We live only by knowing *something* about the future; while the problems of life, or of conduct at least, arise from the fact that we know so little. This is as true of business as of other spheres of activity. The essence of the situation is action according to *opinion*, of greater or less foundation and value, neither entire ignorance nor complete and perfect information, but partial knowledge. (199, emphasis in original)
>
> The 'degree' of certainty or of confidence *felt* in the conclusion after it is reached cannot be ignored. (226–7, emphasis added)
>
> It seems likely that a still further distinction may be drawn, leading to the recognition of another basis of classification of instances in order to reach a probability judgment. We mean *the subjective feeling of confidence of the person making a prediction*. I may have an intuitive feeling or 'hunch' that a situation will eventuate in a certain way, and this feeling may inspire a more or less deliberative confidence by its very strength and persistence. (229, emphasis added)

In each of these passages, Knight references an internal notion of *psychic* or *experienced* uncertainty. This sense of the term 'uncertainty' accords most accurately with standard definitional language, i.e., 'a state of being uncertain or unsure'. This, however, is again not the standard notion of 'Knightian uncertainty' that we are familiar with from the scholarly literature, which notion gets developed in Chapter VIII (bold emphasis added):

> It is this third type of probability or uncertainty which has been neglected in economic theory, and which we propose to put in its rightful place. As we have repeatedly pointed out, an uncertainty which can by any method be reduced to an objective, quantitatively determinate probability, can be reduced to complete certainty by grouping cases. The business world has evolved several organization devices for effectuating this consolidation, with the result that when the technique of business organization is fairly developed, **measurable uncertainties do not introduce into business any uncertainty whatever**. Later in our study we shall glance hurriedly at some of these organization expedients, which are the only economic effect of uncertainty in the probability sense; but the present and more important task is to follow out the consequences of that higher form of uncertainty not susceptible to measurement and hence to elimination. It is this *true uncertainty* which by preventing the theoretically perfect outworking of the tendencies of competition gives the characteristic form of 'enterprise' to economic organization as a whole and accounts for the peculiar income of the entrepreneur. (231–2)

Observe here Knight's explaining that *measurable uncertainties* need not produce *business uncertainty*. How are we to make sense of this statement, which appears to reduce to a claim that uncertainty need not produce uncertainty? Indeed, this statement

follows or, perhaps, is an originator of a long-standing and yet-unresolved debate over whether the locus of uncertainty is external (in the environment) or internal (in the actor) (Townsend *et al.*, 2018). In several instances, especially in Chapter VIII, Knight seems to equate *uncertainty* with what, in Chapter VII, he calls a *probability estimate*. This sense of the word is what has come to be known as 'Knightian uncertainty'. What is meant, in this sense, is not the internal 'state of being unsure' meant in earlier chapters, but 'the inherent, absolute *unpredictability* of things, out of the sheer brute fact that the results of human activity cannot be anticipated and then only in so far as even a probability calculation in regard to them is impossible and meaningless' (Knight, 1921, 311, emphasis added).

If such a probability estimate could somehow be measured, if it could be converted into a 'measurable uncertainty', then this estimate would not produce the type of uncertainty discussed in prior chapters, which is the subjective *experience* of uncertainty—an uncertainty *about* the environment rather than an uncertainty *in* the environment.[10] Such measurable (but not yet measured) probability estimates thus belong to Knight's second class of probability situation, i.e., *statistical probability*. Said differently, Knight's delineation of *risk* and *uncertainty* is not in the givenness of probabilities but in the very existence or measurability of such probabilities. We can then equate them with 'epistemic' (mitigable) risk and 'aleatory' (immitigable) uncertainty (Packard and Clark, 2020). While one can subjectively estimate the statistical probabilities of an unknown distribution, this is not what Knight means by 'estimated probability'.

We might replace instances of 'uncertainty' in the chapters of Knight's volume preceding Chapter VIII with, for example, '*experienced uncertainty',* consistent with the context and his own implied meanings from earlier chapters, and thereby achieve both greater clarity and greater coherence with his metaphysics. To illustrate, allow us to take a couple of reasonable liberties as we reconsider the snippet above from our broader, contextualised understanding of Knight (rewordings bolded):

> The business world has evolved several organization devices for effectuating this consolidation, with the result that when the technique of business organization is fairly developed, **statistical probabilities** do not introduce into business any **experienced uncertainty** whatever. (231)

Here it becomes clear what Knight meant. If economic situations arise where sufficient frequency of repetition allow probability estimates to be more precisely measured, such would allow the situations to become insurable or otherwise actuarially managed, and the experienced uncertainty of the business is thereby alleviated. However, if a life insurer has a single insured, the risk of death, even if known, is not economically 'consolidated' and, so, results in an experience of high uncertainty. In such a situation, the only means by which an actor can decide on an action is by relying on their judgement.

Because they have, like the rest of the economic profession, understood the term 'uncertainty' in the sense of 'probability estimates' or 'unpredictability', Langlois and Cosgel (1993, 460) conclude, with LeRoy and Singell (1987), that 'Knight accepted the applicability of probabilistic calculus' to uncertainty. But this conclusion is suspect. Knight appears to adopt the language of 'probabilities' with respect to uncertainty only with reluctance because its 'usage is so well established that there is no hope of getting

[10] Note that the experience of uncertainty is significantly different from the perception of uncertainty, the former implying an internal locus and the latter implying and external locus that is merely observed internally.

away from it' (Knight, 1921, 224). In our interpretation, Knight must have agreed with Shackle (1949, 111):

> Now if it be agreed that the 'probability' which the enterpriser assigns to a hypothesis concerning the outcome of a *unique* venture is something different from and unrelated to 'frequency-ratio' probability; that it is subjective, and not arrived at either by rigorous logic or by carefully-controlled induction; and really amounts to the assigning of marks to each hypothesis according to the degree in which is possesses some quality other than intrinsic desirability; we have to ask: What is this other quality? What we seek, I think, is a quality which we might call 'credibility', 'plausibility', 'possibleness', the quality of being a reposeful basis for imaginations of success, for hopes and dreams; a foundation which obtrudes no visible on disturbing insecurities, no obvious unrealism, no strained holding together of the picture and consequent distraction from enjoyment of its content.

Like Shackle, Knight may have, if it were possible to break the shackles of institutional language, likely preferred a term such as 'possibility' or 'plausibility' to 'probability' for such 'probability estimates'. However, Knight astutely predicted Shackle's difficulties in compelling the field to loosen their grip on the language of 'probability' and, so, employed instead 'probability estimate' in Chapter VII, which, in Chapter VIII, he confusingly replaces with 'uncertainty'.

RUP aimed to define this until-then neglected probability estimate or 'uncertainty' in economics and to produce a theory of its implications for the market. The latter is accomplished by tying the entrepreneurial function specifically to uncertainty-bearing by organising firms to exploit imagined opportunities. Entrepreneurial success is the result of 'superior judgment or good luck' (Knight 1921, 333). For the existing business organisation, when the entrepreneur's judgement has been proven and the value proposition confirmed, uncertainty gives way to risk.

Similarly, on the market level, risk-bearing firms compete for profit and market share, and their mutual adjustments thereby establish the institutional structure of production, equilibrium prices, and 'economic organization as a whole' (Knight, 1921, 232). But the nature of 'normal' competition may change abruptly and without warning as entrepreneurs attempt novel enterprising. Such potential disruptive events remain unknown to competing firms until their occurrence and, thus, do not constitute experienced uncertainty for the incumbent. There is also no way for incumbents to prepare for the eventuality, since attempts at enterprising, and the potential impact thereof, are truly unpredictable. The uncertainty of this unpredictability is thus borne by the enterprising entrepreneur.

This interpretation is likely to rankle some traditionalists. One might call it a 'Shacklean' interpretation of Knight, which may seem absurd given Shackle's explicit adoption of Keynes's framework.[11] However, Shackle's and Knight's politico-economic philosophies, and especially their anti-positivist tendencies, align well—much better than Knight and Keynes or, even, Keynes and Shackle—and Shackle (1969, 2009), quite by accident it seems, landed upon the superior interpretation and elaboration of Knight's original and intended meaning and aim.

These subjectivist notions of 'experienced uncertainty', external 'unpredictability' and 'situational possibility', as we have read into Knight's work, fit much more cleanly and coherently into Knight's political philosophy. Knight's subjectivism is clear in his

[11] However, Shackle (1958, 66) did praise Knight as 'one of the greatest social philosophers of our times'.

Table 1. *Dehomogenisation of Keynes and Knight*

	Keynes	Knight
Scientific ontology	Modernism	Postmodernism
Scientific epistemology	Objectivism	Subjectivism
Scientific methodology	Empirical rationalism	Historical empiricism
Political philosophy	Liberal socialism	Modern liberalism
Definition of uncertainty	Ignorance of objective (*a priori*) outcome probabilities	Subjective experience of unsurety
Cause of uncertainty	Procedural ignorance/incapacity	Paradox
Nature of uncertainty	Epistemic	Aleatory

voluntarism and, especially, in his postmodern view that 'truth' and 'value' are subjectively defined and pursued—Knight was, in Burgin's (2009, 537) words, 'a philosopher who declared the impotence of truths'. But most of all, Knight's subjective uncertainty underpins his understanding of the human plight, the evolutionary course of humankind in agentic pursuit of greater power, freedom, and self-realisation. The human experience of incessant paradox, of conflicting values and goals, arises from and implies severe *uncertainty* experiences through which actors must make judgement and take intentional action, as best they can, from the possibilities they imagine.

4. Dehomogenizing Knight and Keynes

To reiterate, economic tradition has so closely associated the uncertainty concepts of Knight and Keynes that it is sometimes called the 'Knight–Keynes uncertainty concept' (Williams and Findlay, 1986; Hodgson, 2011, 159). But while several of their conclusions are indeed rather similar, and commonly quoted passages from their individual treatises, taken in isolation, appear nearly identical in content, our review of their distinct philosophies and, especially, how their theories of uncertainty fit within their respective worldviews suggest that this traditional view is inconsistent and likely mistaken. While there are, of course, notable similarities between them such that 'it is legitimate to speak about Knightian and Keynesian uncertainty in the same breath' (Feduzi *et al.*, 2012, 331), Knight's and Keynes's uncertainty theories are, in fact, quite different.

Here we summarise the reviewed differences between Knight and Keynes along several dimensions, from their scientific and political philosophies to their uncertainty theories (see Table 1). In the subsections that follow. we shall elaborate and justify these summarised differences.

4.1. Dehomogenising their scientific philosophies

Starting with their scientific philosophies, Whig interpretations of both scholars have placed Knight and Keynes in the same scientific paradigm: functionalist positivism. But only Keynes was a functionalist.[12] Burrell and Morgan's (1979) typology characterises

[12] While we are aware of no scholars of Knight who would so classify him, we refer here to the significant influence and application of Knight in behavioural research with respect to uncertainty (e.g. Fox and Hadar, 2006; Rakow, 2010), which is almost ubiquitously done from the mainstream vantage of functionalism.

distinct paradigms along two dimensions: objectivism versus subjectivism and the sociology of regulation versus radical change. The functionalist paradigm sits at the intersection of objectivism and the sociology of regulation. Beginning with the second dimension, we characterise Keynes as favouring a sociology of regulation (derived from his technocratic socialist ideology). In contrast, Knight favoured a sociology of radical change (due to his postmodernist views of subjective truth and self-realisation).

As for the first dimension, Burrell and Morgan delineate subjectivism from objectivism along four philosophical delimiters: ontology, epistemology, human nature and methodology. Keynes was a staunch objectivist, whereas Knight stood clearly on the side of subjectivism, as we shall justify. Thus, Keynes has been properly characterised as a *functionalist*, while Knight is better characterised as a *radical humanist* at the opposite corner of the typology.

First, Keynes and Knight differ in their ontological priors. Keynes subscribed to the modernist tradition, while Knight appears to have charted his own metaphysical course, a path that again trod much of the same ground as the proto-postmodern[13] phenomenologists (e.g. Husserl, 2001). In other words, Keynes saw economic science as the study of the 'real' and a path toward humankind's improvement—he was even a leading advocate of scientific eugenics (Fuller, 2019A; Magness and Harrigan, 2020). In contrast, Knight saw 'truth' and betterment as subjective and individual, a personal quest for self-realisation (Gordon, 1974).

Second, they differed in their scientific epistemologies, as previously reviewed, Keynes a positivist and Knight an anti-positivist. Knight was vocal in his opposition to positivism. Keynes's positivism, although never to our knowledge made explicit, is similarly apparent, Keynes an ardent believer in the scientific predictability of social and economic phenomena.

Third, Knight was a voluntarist and Keynes a determinist. Some (e.g. Lawson, 1985, 1988) have supposed Keynes to be a voluntarist on the grounds that he holds that the 'decision to consume or not to consume truly lies within the power of the individual' (Keynes, 1936, 65). However, to ascribe this origination of choice within the individual to voluntarism alone is precipitous—determinists too recognise that decisions originate within individuals while holding such decisions to be wholly caused by predictive factors (Wegner, 2002). Keynes does not endeavour to make his beliefs on free will known—he makes reference to it only once, in *GT*. Taking Keynes's work in aggregate, however, it is clearly implied in his rationalist probability theory in his *TP* and the economic calculus within his *GT* that human action is predictable in principle, and that human caprice is instinctive and animalistic rather than wilful. In this sense, only Knight is a voluntarist (see Knight, 1925).

Finally, these scholars also differ significantly in their preference of scientific method. Knight's preference here is, again, somewhat hard to place. Gordon (1974, 577) put it well: 'Frank Knight was a liberal, but he was also a conservative; an idealist, and also an empiricist; a romantic, and also a utilitarian; and he was a great modern critic of all these'. In the end, it seems that Knight favoured a historical/empirical approach to

[13] The term 'postmodern' was not coined until many decades after phenomenology had become established, and is often ascribed to a particular branch or branches of phenomenology that are characterised as transcendental or idealist (e.g. deconstructionism). Here we use the term more broadly to characterise phenomenology's distinguishing of social science and its method from the natural sciences and their 'Scientific Method'.

science, a 'radical empiricist' that rejected the statistical modelling of the logical positivists, but also the practical usefulness of a rationalism (Bylund, in press). It seems likely that he would have subscribed to one of the versions of moderate realism that emerged after his death (e.g. Bhaskar, 1978, 1998; Giddens, 1984), though it also seems likely he would have found fault in each one. Keynes was a moderate rationalist (O'Donnell, 1989), relying on empirical observations to generate direct knowledge and evidential weight, but supposing that economic actors could and did predictively calculate indirect knowledge (i.e. logical deductions) from their direct knowledge of probability-relations. High-knowledge experts, with the most direct knowledge and greatest evidential weight, could therefore most rationally predict social outcomes.

We conclude, then, that Knight and Keynes were, in fact, very far apart with respect to their scientific philosophies, occupying opposite corners of Burrell and Morgan's (1979) sociological paradigm typology.

4.2. Dehomogenizing their political philosophies

Tradition also holds that Knight and Keynes shared a contemporary political ideology: liberalism. Closer inspection of their personal and academic writings reveals, however, that such a characterisation misses the mark in both cases. Keynes was decidedly *not* a liberal (in the mid-nineteenth century sense), although he strategically aligned with the Liberal Party at times during his political career. Instead, throughout his adult life, he publicly advocated a non-Marxist socialism (Fuller, 2019B). Keynes imagined a society of individual actors making decisions within the confines of an economy with central direction by expert technocrats who would be better positioned or equipped to identify and employ the most rational probabilities.

> I believe that in the future, more than ever, questions about the economic framework of society will be far and away the most important of political issues. I believe that the right solution will involve intellectual and scientific elements which must be above the heads of the vast mass of more or less illiterate voters. (Keynes, 1971, vol. IX: 295)

These socialist tendencies towards scientific social design clearly underpin his theorising, expecting the rationalistic expertise of the technocratic elite to facilitate the social and economic planning of superior societies, with the State as their primary vehicle (Terra *et al.*, 2020). In particular, in order to quell the irrational capitalists' 'animal spirits', Keynes long advocated a 'Board of National Investment' that would 'control by far the greater part of investment' in the economy (Keynes, 1971, vol. XIV: 49). However, Keynes recognised that the complexities of the socio-economic realm were contemporaneously too severe for the successful planning of some sectors of the economy, and thus recommended that such markets be left free to function with only moderate regulatory oversight until scientific advancement would make the central planning of those sectors more optimal.

Knight was also not simply a 'liberal', but developed a political philosophy far more nuanced and complex than most realise. For example, while a proponent of core liberal values and markets, he also condemned liberalism and once, in 1932, even exhorted people to vote communist (Burgin, 2009). He called his own view 'modern liberalism', which perhaps aligns in many respects with the radical liberalism of Foucault. He saw the natural war of social existence between freedom and power, a paradoxical war because each individual sought both, power over others in order to maximise their

own freedom. He greatly feared inequality on these grounds—not just the economic inequality that pervades economic discourse today, but even more the inequality of power and its propensity to exploit the unpowerful. He found paradox to be the central feature of life, which paradox also plagued his political views. For example, he considered potentially legitimate a State's redistribution of economic inequalities in an effort to mitigate excess power, but also acknowledged that to allow such would endow State bureaucrats with too much power.

Keynes's and Knight's distinct political views, as we have argued, align with and often underpin their scholarly works, including their theories of uncertainty.

4.3. Dehomogenizing their uncertainty theories

Finally, we conclude that Keynes and Knight did *not* in fact produce highly similar theories of uncertainty. In fact, the notion of uncertainty that has become known as the 'Knight–Keynes uncertainty concept' is, we argue, an oversimplification of *both* authors, a reduction of their core insights into a superficial construct that fits the modern economic zeitgeist, reached by focussing myopically on particular statements and insights outside of the context of their personal philosophical worldviews and instead through the lens of standard econometric theory. Such 'Whig' interpretations have been criticised and, to an extent, corrected (e.g. Langlois and Cosgel, 1993; Jarvis, 2010). But we conclude that their uncertainty theories are, in fact, far more different than even recent revisions have recognised based on our closer examination of their writings through the lens of their respective philosophic priors.

First, Knight and Keynes derive from their different philosophical worldviews distinct definitions of uncertainty. Keynes's is a wholly *epistemic* uncertainty concept (see Packard and Clark, 2020), the ignorance of an actor regarding the objective and knowable (*a priori*) probabilities of future outcomes. Such probabilities are discoverable by learning the underlying 'probability-relations' between causes and effects. Scientific efforts mitigate uncertainty by illuminating these probability-relations and by producing ever-increasing evidential weight until each uncertainty is eventually absconded.

Knight, instead, sees uncertainty as *aleatory*—i.e., due to utter indeterminism—and as a subjective state of being, a *result* of the unknowability of external reality and the paradoxes that fill it. He confusingly employs the language of 'uncertainty' for both cause (probability estimate) and effect (being unsure), a confusion that has persisted today. However, both of these uncertainty concepts are distinct from the purely epistemic characterisation proffered by Keynes. The internal experience of uncertainty, for Knight, is innate to human existence and the paradoxes that characterise it. The unpredictability of the world is derived primarily from our coexistence with others and 'the sheer brute fact that the results of human activity cannot be anticipated' (Knight, 1921, 311). Because of this, entrepreneurs in a market economy must rely on personal judgement, upon which their uncertain decisions must ultimately be based.

In summary, Knight and Keynes derived very different uncertainty concepts, embedded within vastly different economic theories, with clearly distinct implications, which we will briefly elaborate by applying the new institutional economics framework.

5. Keynes, Knight and new institutional economics

Because of their different ideological priors and uncertainty theories, it should be no surprise that Knight and Keynes each understood the role of economic institutions, and the policies necessary to properly support or direct economic organization and processes, differently also. Defined as 'the rules of the game in a society, […] the humanly devised constraints that shape human interaction' (North, 1990, 3), institutions provide the structure within which economic action takes place. This structure standardises behaviour by lowering the cost of certain kinds of actions, thereby increasing the relative cost of other kinds. As a result, they make possible a convergence of expectations that *reduce uncertainty* (North, 1990; cf. Bylund and McCaffrey, 2017).

Because institutions span the macro–micro divide, the new institutional framework facilitates analysis that bridges the divide between (Keynesian) macroeconomic and (Chicago school) microeconomic approaches. Institutional analysis applies regardless of the level of analysis or whether the institutions are formal or informal. The objective of such analysis is to 'get the institutions right' (Williamson, 1994, 172), 'to reduce uncertainty by establishing a stable (but not necessarily efficient) structure to human interaction' (North, 1990, 6), and to thereby establish a well-functioning economy that, consequently, facilitates cooperation (North, 1990, 11–6). This structure consists of the rules that produce a convergent behavioural pattern that is largely consistent in the aggregate, which in turn increases systemic predictability that limits and makes expectations more reliable (if not accurate). This new institutional perspective provides a useful lens through which we can clarify Keynes's and Knight's respective theorising and, thus, better disentangle their theories and conclusions.

Keynes saw economic uncertainty as epistemic and mitigable, especially by scientific experts, and the role of institutions (or rules) contingent. Where such uncertainty still persists even for experts, institutional rule-following may be justifiable. However, he explicitly rejected institution-following as a general principle. In fact, he viewed institutions as antiquated and unnecessary, preferring the rational calculation of technocrats as a more efficient and effective determination of optimal behaviour. Thus, for Keynes, economic planning was not only possible but also more efficient than the liberal adherence to economic institutions. His calling the gold standard 'a barbarous relic' (Keynes, 1923, 172) illustrates his view of economic institutions, which leave the economy beyond the influence and direction of rational experts. He strongly believed and actively advocated central governance of economic investment to avoid the irrationality of human caprice. As the rational probabilities for all propositions are *logically* determinable *a priori*, the limitation for rational decision-making is intellectual rather than informational, although such rationality must expectedly improve with a growing body (and thus weight) of evidence.[14] In

[14] On how much information is worth collecting, Keynes (1921, 84–5) writes: 'Bernoulli's second maxim, that we must take into account all the information we have, amounts to an injunction that we should be guided by the probability of that argument, amongst those of which we know the premisses, of which the evidential weight is the greatest. But should not this be re-enforced by a further maxim, that we ought to make the weight of our arguments as great as possible by getting all the information we can? It is difficult to see, however, to what point the strengthening of an argument's weight by increasing the evidence ought to be pushed. We may argue that, when our knowledge is slight but capable of increase, the course of action, which will, relative to such knowledge, probably produce the greatest amount of good, will often consist in the acquisition of more knowledge. But there clearly comes a point when it is no longer worth while to spend trouble, before acting, in the acquisition of further information, and there is no evident principle by which to determine how far we ought to carry our maxim of strengthening the weight of our argument. A little reflection will probably convince the reader that this is a very confusing problem'.

short, Keynes's theory of institutions amounts to little more than a rejection of them, supposing the following of institutional rules to be unnecessary and irrational compared to the rational central planning of experts. Thus, he advocated a system of socialistic deference to a technocratic elite, who could more rationally direct economic processes.

Knight's view of uncertainty was essentially the opposite, comprising an aleatory and immitigable uncertainty (see Packard and Clark, 2020), resulting from subjective and often contradictory values and preferences. Correspondingly, institutions played a vital role in Knight's economic theory (Hodgson, 2004; Asso and Fiorito, 2008). However, Knight saw institutions as far more limited and inefficient than many of his liberal contemporaries and, even, many of the new institutional economists. This is because he viewed economic actors as warriors within their own personally unique battles, each one battling idiosyncratic paradoxes and uncertainties. Thus, 'Knight saw the forces of institutionalisation and of indeterminate individuality as *both* being at play' (Hodgson, 2004, 332). He saw institutions as 'belong[ing] to an intermediate category, between instinct and intelligence' (Knight, 1947, 224) in the same sense that, in economics, he sought a 'correct "middle way"' between deductive 'pure theory' and induction (Knight, 1921, 6; cf. Hudik and Bylund, in press). While institutions help actors navigate uncertainty and facilitate prediction in the context of social interaction, each case is sufficiently unique that the effectiveness of institutional rule-following will be contextually different (notably, a point Keynes also observed). As a result, he saw institutions as contingently applicable and evolutionary—a tension between conditioned institutional *behaviour* and intentional institutional *activity* (Knight, 1942, 260; Asso and Fiorito, 2008, 73). Foreshadowing the notion of institutional entrepreneurship, he expected the role of 'institutional economics' to be the study of 'the cumulative changes of institutions' (Knight, 1924, 264). He saw institutions as weaker in power than most modern institutional theorists, incapable of countermanding the will of actors, but supremely valuable to actors who must constantly navigate radical uncertainties. Indeed, while the uncertainty borne by entrepreneurs is not mitigated by the institutional setting, the institutions of the market determine the nature and extent of risk-bearing through types of business organisations. Institutions are the mechanisms by which economies self-organise through, among other things, the price mechanism's allocation of resources and competition's determination of the structure of production (Hayek, 1931). The role of policy is to facilitate productive institutions that assist in the market economy's provision of valuable goods and services and maximise self-realisation.

Neither Keynes nor Knight should be called a progenitor of modern institutional economics, but the institutional perspective allows us to identify important differences between their perspectives and theories. Keynes rejected institutions as a primary economic mechanism, finding them unnecessary and inefficient for an advanced society. Knight's economic framework was inclusive of institutions, but held a far more nuanced and impotent notion of institutions than those arrived at in sociology (DiMaggio and Powell, 1983) and even new institutional economics (North, 1990). We think Knight's formational work offers a lot of promise as a new or alternative foundation for future institutional theorising, although Keynes's immoralist ethic is also worthy of closer examination.

6. Conclusion

We have delved deeper into the thought of both Keynes and Knight to better understand and distinguish their economic theorising. Tradition holds Keynes and Knight to be philosophically aligned and their uncertainty concepts to be functionally similar. We have argued that this tradition oversimplifies both scholars. A better reading of each, we think, would contextualise Keynes's and Knight's theorising, including their theories of uncertainty, within their stated and implied worldviews and philosophic priors to guide our interpretations.

Recognising vastly different philosophical priors, we have here observed that the uncertainty theories of Keynes and Knight are clearly distinguishable, and not in minor ways. While we agree that '[Keynes's] conception of uncertainty…is strongly reminiscent of that expressed in Knight's (1921) famous distinction between risk and uncertainty' (Faulkner *et al.*, 2017, 1292), our aim has been to highlight and elaborate their core differences with regard to uncertainty so as to aid researchers who may be operating under different priors. Keynes's theory of uncertainty is a rationalist–positivist approach that sees the world as innately probabilistic (albeit not often in a strictly measurable sense) and generally predictable *a priori*. Thus, uncertainty is a temporary (even if long-term) and mitigable phenomenon that primarily plagues the capricious unlearned, while the learned are more 'rational' and reliable. In contrast, Knight sees uncertainty through a lens of indeterminism, which universally underpins the human experience of constant tensions and paradoxes—value tradeoffs in everything—that undermine the knowability of nearly any outcome. Thus, uncertainty is not only non-probabilistic, but *idiosyncratic*, unique to each actor's subjective circumstances.

Keynes and Knight inferred from these distinct worldviews and uncertainty theories vastly different economic theories, including the economic role of institutions. For Keynes, institutions were antiquated and unnecessary for an advanced, scientific society. He instead favoured technocracy by expert planners as a superior mechanism for resource optimisation to limit the inefficient influence of the 'animal spirits' of those with lesser ability. Knight, on the other hand, saw institutions as necessary for navigating the radical uncertainty of economic experience, but saw them as imperfect and overly ambiguous. Rather than 'reducing uncertainty', as the new institutional economists suppose, he saw institutions as evolving guides that aid individual actors in their own navigation of their own uncertainty. His economic theory, correspondingly, is complex and fragile, a constant tension between freedom and power.

We leave to readers what further conclusions to draw from these differences. Both Keynes's and Knight's works on uncertainty, if not their economic theorising, have very often been oversimplified and even misunderstood. In many ways, our contextualisation and dehomogenisation make them both and each vastly more interesting. For although they have each been widely read, yet they both still have something very *new* to contribute to economic theory.

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