KEYNES, KNOWLEDGE, PROBABILITY AND
THE METHOD OF ECONOMICS[*]

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The hope, which sustained many investigators in the course of the nineteenth century, of gradually bringing the moral sciences under the sway of mathematical reasoning, steadily recedes -- if we mean, as they meant, by mathematics the introduction of precise numerical methods. The old assumptions, that all quantity is numerical and that all quantitative characteristics are additive, can no longer be sustained. Mathematical reasoning now appears as an aid in its symbolic rather than in its numerical character. I, at any rate, have not the same lively hope as Condorcet, or even as Edgeworth, 'éclairer les Sciences morales et politiques par le flambeau de l'Algèbre'.

A Treatise on Probability, 1921

We are merely reminding ourselves that human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist ; and that it is our innate urge to activity which makes the wheels go round, our rational selves choosing between the alternatives as best we are able, calculating where we can, but often falling back for our motive on whim or sentiment or chance.

The General Theory of Employment, Interest and Money, 1936

The pseudo-analogy with the physical sciences leads directly counter to the habit of mind which is most important for an economist proper to acquire.
I also want to emphasise strongly the point about economics being a moral science. I mentioned before that it deals with introspection and with values. I might have added that it deals with motives, expectations, psychological uncertainties.

Letter to Harrod, 16 July 1938

The passage from *A Treatise on Probability* quoted above appeared in slightly modified form in the first version of the dissertation on probabilities that Keynes presented in December 1907 as part of his attempt to obtain a fellowship at King's College. Contrary to Keynes's prediction, the efforts to bring 'the moral sciences under the sway of mathematical reasoning' was not receding at that time, particularly in economics. This drove him, three decades later, to criticize sharply the tendency towards the mathematization of economics and particularly the emerging field of

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econometrics. And if Keynes were resurrected today, it would be to discover that the subordination of the moral sciences to mathematics has been further consolidated, not only in economics, which increasingly resembles a branch of applied mathematics, but in several other social sciences as well.[1]

We are here in the realm of the theory of knowledge, a battleground on which Keynes waged war against economic orthodoxy, which he called classical theory. He accused the classical theory of errors in its analysis of the functioning of economies and in the solutions it put forth to solve their problems, such as proposing to lower wages in order to increase employment. He accused this theory of not taking into account to a sufficient degree history and institutions. He considered these errors to be the result of a mistaken conception of science and an incorrect method of analysis. To support this view, Keynes relied on a reflection that went beyond the boundaries of economics and that concerned the nature of knowledge and the connections between knowledge and action. In the following pages, we will examine Keynes's theory of probabilities, his subsequent critique of statistical inference in the field of social science and his conception of economic thought.

Uncertainty and probability

First works: from ethics to epistemology

In the field of ethics, it is necessary, according to Moore, to distinguish reflection on the nature of good from that which concerns the action required to achieve such good. In 'My Early Beliefs' (1938-12), Keynes qualifies as a religion, the conception of good that Moore gives in the final chapter of *Principia Ethica* entitled 'The Ideal'. He calls moral the answer to the second question, formulated in the chapter entitled 'Ethics in Relation to Conduct', chapter in which Moore introduces the notion of probability. We cannot in effect foresee with certitude the result of our actions. It is impossible to know if a given action will bring about in the long term more good than evil. We have no means of concluding that, when we must choose between two actions, one will bring about more good than the other: 'we can certainly have no rational ground for asserting that one of two alternatives is even probably right and another wrong' (Moore 1903, p. 203). Moore concludes from this that one must resolve to follow conventions and traditional morality. For Keynes, as we have seen, Moore's conclusion is unacceptable. One must be able to judge the rightness of an action, and thus act, but without knowing with certitude its consequences. On the basis of ethical problems, which confront societies as much as individuals, Keynes moves towards reflection of an epistemological nature.

The theme of uncertainty is present in Keynes's thought from beginning to end of his adult life.[2] Before his encounter with Moore, in the first essays he composed while studying at Eton, the young Keynes already insisted on the importance of time, on the precariousness and transitory character of human affairs and on the uncertainty in the context of which man acts. One must act, in one's private as well as one's public life, in spite of the fog clouding our path. It is

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[1] At the beginning of the century at Cambridge, what was called the moral sciences included four subjects: moral and political philosophy, logic, philosophy of mind (which was in fact psychology) and political economy. In what follows, 'moral sciences' and 'social sciences' will be used synonymously.

[2] But not every one agree on this. See in particular Bateman (1996) who argues that Keynes rejected the use of the idea of uncertainty in the period when he was writing *A Treatise on Money*, coming back to it later.

here that the idea of probability comes in. In 1904, he presented to the Apostles an important paper dealing with Chapter Five of *Principia Ethica*, 'Ethics in Relation to Conduct'.[3] This paper contains some of the main ideas of the *Treatise on Probability* as well as the argumentation that Keynes would use in his debates with Pearson and Tinbergen, which we identify below.

To counter Moore's argumentation and demonstrate that an individual can act in a situation of uncertainty, Keynes turned to the concept of probability. For Keynes, the numerical comparison between a number x of occurences of a given event and the number y of elements of a set of reference, which is the conception used by Moore, is far from exhausting the meaning given to the term probability. Moreover, probability does not admit a rigorous and satisfying definition and can only be grasped by intuition: 'Any adequate definition of probability I have never seen, and I am unable to give one' (1904-3, p. 3).[4] However, he adds, 'it is possible to refute definitions and to find out the real question at issue' (ibid.). A good part of the task he would accomplish from this date consisted of criticizing and sharply attacking several of his predecessors, as he would do with economists in *The General Theory*.

Keynes had alternative names for the conception of probabilies he criticizes: frequentist, quantitative, mathematical, and statistical.[5] It is based on the principle of non-sufficient reason that he would call in *A Treatise on Probability* the principle of indifference. Equiprobability and the law of great numbers[6] reflects the same idea: 'According to this view "x will probably happen" means "I do not know whether x will happen in any particular case, but, if a large number of cases be taken, I do know for certain that x will happen more often than not"' (ibid., p. 2). Keynes relates that Karl Pearson[7] spent one of his holidays tossing a coin 25 000 times and noted that it fell roughly half the time heads, which allowed him to affirm the probability of such an occurrence as 50 per cent. Repeating this experiment with the roulette wheel at Monte Carlo, Pearson observed the results did not seem to obey the same rules, which brought Keynes to conclude: 'it is about time that men of science reconstructed their theory of probability' (ibid., p. 9). The problem comes from the fact that probabilies are most often considered in relation to games of chance. Now, these situation are not the most typical when it is a matter of applying probabilities. According to Keynes, very few cases can be dealt with mathematically in light of the law of great numbers.

Probability is linked to the fact that man must make decisions without knowing what the future will entail. Ignorance, which is at the heart of the human condition, must not prevent us from judging the rectitude of an action and of acting:

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[3]When the paper, which does not carry a title, was written is uncertain. Skidelsky (1983, p. 152) claims it to be on January 23rd 1904, O'Donnell (1989, p. 10) before April 1904, while Moggridge (1992, pp. 131-36) believes it could have been written two years later.

[4]On the multiple meanings of probability, see Nadeau (1999); on probabilities in economics, Hamouda and Rowley (1996).

[5] There were important changes in the frequentist perspective after 1905, as French, Soviet and US mathematicians tried to remove the inadequacies of limited frequences on a basis for probability. It does not seem that Keynes kept abreast of these developments. On the other side, there is a large literature on intuitive and other non-frequentist perspectives. See for example Walley (1991).

[6] The law of great numbers, formulated by Jacob Bernoulli at the beginning of the 17th Century, states that in any chance event, when the event happens repeatedly, the actual results will tend to the calculated, or planned result. In other words, repeated actions over time will produce the results we seek. In Keynes's words, Bernoulli showed that 'if the *à priori* probability is known throughout, then *in the long run* a certain determinate frequency of occurrence is expected' (1921-1, p. 365).

[7]Regarding Karl Pearson, refer to the section below that presents his debate with Keynes.

Probability implies ignorance; it is because we do not know for certain that we use the word at all; and the fact that it is possible (in the sense that it is not self contradictory) that every action producing a balance of good in the immediate future may produce a vast balance of evil on the whole, is no bar to our assertion, until we have further evidence, that such an action is probably right. (1904-3, p. 14)

We want to say '*x* is probable right', Keynes insisted, even if there is no way of knowing what the total consequences of our action will be in a 100 years from now. The situation is complicated by the fact that there exists what Keynes, following Moore, calls organic unities. Even when it concerns nature, the atomic hypothesis which organic unities oppose is most often denied. The presence of organic unities is still more evident when it is a question of social, human, psychic events, which are most of the time complex in nature and composed of more simple elements. A characteristic of a given set is not necessarily the sum of the characteristics of its elements. For example, most often, if b stands for goodness, b (x + y) is certainly different from b (x) + b (y). Keynes discusses the doctrine of organic unities in several writings, and particularly in a set of notes composed between July and September 1905 entitled 'Miscellenea Ethica' in which he alludes to economic theory, whose great authors he started to read systematically at that time:

> As I understand this doctrine, it prevents our drawing any conclusion as to the value of a whole by a consideration of the value of the parts. The goodness of a whole is not the sum of the goodness of its parts, nor is the value of a group of individuals necessarily the same as the sum of their values taken separately. . . . The fact that utility belongs to this class leads to difficulties in the pure theory of economics. (1905-1, pp. 20-1)

From dissertation to book

In December 1907, Keynes submitted the first version of his dissertation, entitled *Principles of Probability*, to Kings College in the hope of obtaining a fellowship. This writing contains much of what would be found in the 1921 book. He affirms from the start that this work is a matter from logic and not mathematics. He launches a general attack on the manner of seeing probabilities inspired by Laplace and emphasizes 'the extraordinary immature condition in which the student still finds the logic of Probability' (1907-1, p. 3). Following Laplace's logic, one is able to demonstrate God's existence as easily as the law of gravitation. It is not possible, for example, 'to confound Professor Pearson's theories and mock at his laws' (ibid., p. 228). The confusions surrounding the definition and interpretation of induction have never been dissipated (ibid., p. 260). One can demonstrate that, on these questions, the main conclusions of Condorcet, Laplace, Poisson, Cournot, De Morgan and Boole are false (ibid., p. 336). Of the 445 works figuring in his bibliography, Keynes writes with 'a feeling of melancholy' that less than 100 are still worth reading: 'The time is rapidly approaching when the labours of research should be lightened, wherever it is possible, by the existence of an accredited *Index Expurgatorius*' (ibid., bibliographical annex, p. 5).

It is not surprising that this dissertation from a young man of 24 could have irritated a few elders. In his report to those voting on the post of fellow, A. N. Whitehead underlined that the controversial nature of the subject lead the candidate to commit several errors. Whitehead considered Keynes's criticism of the Venn and Crystal school superficial; but he was careful to add that his judgment was perhaps biased because he himself adhered to the frequentist school rejected by Keynes. Anticipating a criticism that would often be made against Keynes, he

wrote: 'He invariably considers the arguments in its favour at their stupidest, and never attempts to make the theory work by any added subtlety of his own. In short he dismisses the theory in the most dogmatic unconvincing manner' (KP, TP/4, p. 2). Curiously, Whitehead considered the philosophic part the weakest and the purely mathematical contributions the most significant, while concluding that Keynes's work was remarkable. The other examiner, W. E. Johnson, was more favourable than Whitehead. The voters decided nevertheless to choose a candidate other than Keynes for the position, which did not mean that Keynes's dissertation was refused. He was free to present himself again the following year with a revised version of his work. This resubmission is what Keynes did. The polemical tone was attenuated; the candidate underlined however that it was difficult to avoid controversy. In a new report, Whitehead wrote that there had been a tangible improvement in Keynes's writing and added that he understood it better. In fact, his own future works, like those of his coauthor Russell, would be somewhat influenced by Keynes: 'Accordingly I now accept his contention that probability cannot be solely derived from ideas of 'frequency', more or less obscurely present in the mind' (ibid., p. 8).[8] Moreover, Whitehead, while praising the Keynes's 'charming literary style', reproached him for confusing literary style and one appropriate to logic and philosophy.

On the basis of the second version of his work, Keynes was named fellow of King's College. In 1910, he signed a contract with Cambridge University Press for the publication of the reworked version of his dissertation. The contract was cancelled in 1912 on Keynes's request, who would from then on publish all his books with Macmillan. The considerable effort he devoted to reworking his thesis may be followed step by step in his correspondence. Like his works to come, this effort was not done in solitude. Keynes submitted his chapters and discussed them with friends and colleagues. Among others, Russell contributed. While Keynes indicated that he was largely inspired by his friend's *Principles of Mathematics* in the preparation of his dissertation, Russell was one of the first to make public Keynes's theses in *The Problems of Philosophy*, published in 1912: 'I have derived valuable assistance from unpublished writings of G. E. Moore and J. M. Keynes ; from the former, as regards the relations of sense-data to physical objects, and from the latter as regards probability and induction" (Russell 1912, p. 5)' Keynes wrote to his parents 19 July 1914: 'I had 5 $^{1/2}$ hours with Johnson on Friday and got some most useful criticisms and suggestions. From conversations with Russell and Broad I have got less. I have been very much encouraged by Johnson's and Russell's reception of my Theory of Induction. They are both exceedingly complimentary. I finished this two or three years ago, but no one has read it until now'. In his autobiography, Russell wrote that although he did not have contact with Keynes in what concerned his political and economic works, 'I was considerably concerned in this *Treatise on Probability*, many parts of which I discussed with him in detail' (Russell 1967, p. 71). Moore also helped in the correction of the book's proofs during a summer excursion (letter to his father, 26 July 1914). Clive Bell, who lived in the same house as Keynes at the time the latter was putting the final touches on his manuscript, recalled: ' And after the war, when he took up the manuscript of his old dissertation with a view to making a book, he would . . . occasionally hand me a much corrected sheet saying . . . "can you remember what I meant by that?"' (Bell 1956, p. 59).

The Treatise on Probability

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[8] This does not mean that Whitehead accepted Keynes's notion of logical probability. Frequentism was rejected at that time by the newly developed axiomatization of probability and ergodic theory.

Keynes's *Treatise on Probability* is not a textbook of probability theory. It is, affirms the author in the first version of his dissertation, in 1907,, a work of logic, whose main object is a reflection on knowledge and the '*laws of thought*' (1921-1, p. 144 ; Keynes's italics) in relation to action. Keynes was first inspired by Leibniz who conceived, in a dissertation composed at the age of 23, of probability as a branch of logic. In this sense, Keynes pursued the reflection began by his father in 1884 and similarly went on to apply it to economics. More precisely, probabilities constituted 'that part of logic which deals with arguments which are rational but not conclusive' (ibid., p. 241). Most of these arguments arise from induction and analogy. Almost all empirical sciences, but also decisions which must be taken in everyday life, both private and public, rest on this type of argumentation. The field of application is thus vast.

A probability is not an objective, natural fact, as the frequentist interpretation imply. It expresses the degree of belief that it is reasonable to hold toward a set of propositions *a,* in light of a set of propositions *h*: 'it is concerned with the degree of belief which it is *rational* to entertain in given conditions' (ibid., p. 4). The probable is that in which it is reasonable to believe, in light of our knowledge: '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' (ibid.). It is a logical relation between two propositions or two sets of propositions manifested in the mind of individuals. It is not a relationship between a statement and a reality: 'Probability begins and ends with probability' (ibid., p. 356). A relationship of probability can be expressed by the symbol 'a/h'. The knowledge of a situation in which 'a/h = 1' is certain. A situation in which 'a/h = 0' constitutes an impossibility. In the majority of real cases, this figure is situated between 0 and 1. And, in the majority of cases, numbers have only an ordinal meaning. By this, Keynes means that it is often impossible to quantitatively compare two probabilities and to affirm, for example, that the chances of one event taking place are *x* times higher than the chances of another event taking place. Moreover, it is possible that two probabilities be incomparable: 'it is not always possible to say that the degree of our rational belief in one conclusion is either equal to, greater than, or less than the degree of our belief in another' (ibid., p. 37). And one is inclined to think that, in social and human reality and perhaps even in the natural world, probabilities are in most cases non quantifiable and incommensurable, all the more so since they are bound by the limited power of human reason. Even when individual probabilities are numerically measurable, we cannot go very far in mathematical reasoning. It is moreover difficult to eliminate intuition and direct judgment from the consideration of probabilities (ibid., p. 56). This difficulty restricts the scope of frequentist probabilities founded on the law of great numbers. Even in the domain of natural sciences, intuition and analogy play a more important role than the manipulation of statistical frequencies.

The quotation at the beginning of this chapter, and of which one finds a version as early as 1907, gives evidence of this. Keynes believed that several great thinkers—Condorcet, Bernoulli, Bentham, Laplace, Edgeworth and others—were mistaken in thinking that one could apply principles coming from equiprobability to the moral sciences and thus mathematically quantify, measure and formalize social reality. In the domain of ethics, one was brought to believe that 'degrees of goodness are numerically measurable and arithmetically additive' (ibid., p. 343), while the question of right action arises from intuitive judgment. Keynes denounced this 'mathematical charlatanry' which had undermined for a century theoretical statistics (ibid., p. 401) and was supported by a total confidence in statistical inference. In economics, we will see that this error is supported by the quantification illusion according to which things such as utility can be quantified, measured, added and subtracted. This error leads to an abusive use of statistics

which, as a means of quantitatively describing reality, transformed itself into an instrument of prediction.[9]

Among the many additions to the published version of his manuscript, one would resurface in his economic analysis, namely the question of the 'weight of arguments', which Keynes defined as the quantity of evidences on which a set of propositions is based. It must be distinguished from the more or less favourable character of evidences, their probability in the strict sense. Thus, the probability of an error does not necessarily go down as the weight of an argument goes up. Like probability, weight cannot generally be measured. This element in *A Treatise on Probability* is the only one to which *The General Theory* (1936-1, p. 148) would explicitly allude[10]. But the influence of the *Treatise* on Keynes's work in economics work goes beyond this question. It includes several other elements such as the principle of risk, in accordance to which it may be more rational to aim at a lesser good that can be obtained with more probability, than a greater good associated with less probability.[11] But, more globally, it is the vision of knowledge that is at stake.

Criticisms and revisions: Ramsey and Wittgenstein

The *Treatise on Probability* would acquire a singular destiny. Published well before the unleashing of the Keynesian revolution, it was remarked on by a few economists at the time of its publication[12] but went unnoticed by most. This situation would last until the 1970s. The editors of the *Collected Writings* decided to publish this book not in chronological order as they did for Keynes's other seven monographs but as an eighth title. They included in it an editorial foreword signed by philosopher and friend of Keynes, R. B. Braithwaite, so as to facilitate its access to economists.[13] The situation changed at the start of the 1980s, with works by Skidelsky (1983), Bateman (1987), Carabelli (1988), Fitzgibbons (1988), O'Donnell (1989), who inaugurated a body of work investigating the relations between philosophy and economics in Keynes as well as the continuity of his philosophic vision.

Amongst mathematicians and philosophers, there was much interest. In the months following its publication, critical reviews were numerous. Keynes's book, 'the first systematic work in English on the logical foundations of probability for 55 years' (Brathwaite, 'Editorial foreword' in 1921-1, p. xv) became a reference to this day: 'The first major effort to construct a theory of imprecise probability was made by Keynes (1921). Keynes aimed to develop an inductive logic, based on a logical interpretation of probability as a "degree of rational belief". . . . Since Keynes, a large literature has grown up concerning the mathematics and interpretation of imprecise, epistemic probabiliites"' (Walley 1991, p. 44-5). For Max Black, author of the article on Probability in the *Encyclopedia of Philosophy* edited by Edward Carrick (1967), Keynes's

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[9] On these questions, see Porter (1986) and (1995). Hayek also wrote on the quantification bias.

[10] See also the correspondence on this subject with Hugh Townsend in JMK 29, p. 293.

[11] We will see the important role this idea will play in Keynes's political vision. On the relation between uncertainty and risk, see Lavoie (1985).

[12] See for example Pigou (1921), who thus concludes his review: 'For the problems which Mr. Keynes has touched he has not only illuminated with a marvelous lucidity of style, but has also substantially advanced. Economists will recognise with pride what one of their number has accomplished in another field, and will look forward with added zest to his next essay in their own' (Pigou 1921, p. 512). Pigou's critique of *The General Theory* would be much less praiseworthy.

[13] 'As Keynes says (p. 473), his *Treatise* was the first systematic work in English on the logical foundations of probability for 55 years. . . The originality of Keynes's approach lay in his insistence that probability, in its fundamental sense, is a logical relation holding between propositions which is similar to, although weaker than, tat of logical consequence' (Brathwaite, 'Editorial Foreword', 1921-1, pp. xv-xvi).

'eloquent defence of logical approach against its rivals' is being 'largely responsible for its present vogue' (quoted by Brathwaite, ibid., p. xvi). For Brathwaite, 'The originality of Keynes's approach lay in his insistence that probability, in its fundamental sense, is a logical relation holding between propositions which is similar to, although weaker than, that of logical consequence' (ibid., pp. xvi).

The non frequentist conception of probabilitiesconceived as relations between propositions was also the focus of critics. Bertrand Russell affirmed that this book, 'undoubtedly the most important work on probability that has appeared for a very long time' (Russell 1922, p. 119), could not be praised enough, even though he did not accept probabilities as indefinable and, in the majority of cases, non-numerical. Probabilities constituted according to him a branch of mathematics and not, as Keynes believed, a branch of logic. He reproached the latter for presenting him as the sole author of *Principia Mathematical*, all of whose passages result from a joint effort between himself and Alfred Whitehead. In one of the most detailed reviews, C. D. Broad wrote that Keynes's long awaited book 'will at once take place as the best treatise on the logical foundations of the subject', and declared himself 'substantially in agreement with him' (Broad 1922, p. 72).

One of the most serious criticisms came from a young mathematician of genius, Frank Ramsey,[14] for whom Keynes had great admiration. Ramsey accused Keynes of confusing the existence of relations of probabilities with their perception. There is no necessary correspondence between the two:

> But we are concerned with the relation which actually holds between two propositions; the faculty of perceiving this relation, accurately or otherwise, we call insight, perfect or imperfect. Mr Keynes argues that owing to the possibility that our insight may be all wrong we should talk not of the relation which actually holds, but of the relation which, we have reason to suppose, holds. (Ramsey 1921, p. 4)

Ramsey returned to this attack during a conference, 'Truth and Probability', given before the Cambridge Moral Science Club in 1926 and published posthumously in 1931. For him, probabilities do not concern objective relations between propositions, but rather degrees of belief. Calculating probabilities consists in establishing a set of rules permitting degrees of belief to form a coherent system. Relations of probability as described by Keynes do not exist: 'I do not perceive them, and if I am to be persuaded that they exist it must be by argument; moreover I shrewdly suspect that others do not perceive them either, because they are able to come to so very little agreement as to which of them relates any two given propositions' (Ramsey 1926, p. 161). Regarding his Cambridge critics, Keynes wrote to Broad on 31 January 1922:

> But what I really attach importance to is, of course, the general philosophical theory. I am much comforted that with that you are in general agreement. But I find that Ramsey and other young men at Cambridge are quite obdurate, and still believe that *either* Probability is a definitely 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

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[14]Author of two influential articles on savings and taxation, Ramsey, a Cambridge student, apostle, fellow of King's College from 1924, died in 1930 at the age of 26. For Keynes, he was 'certainly far and away the most brilliant undergraduate who has appeared for many years in the border-country between Philosophy and Mathematics' (Letter to Broad, 31 January 1922, KP, TP/1/1).

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. (KP, TP/1/1)

It was this very general philosophical vision that was then being transformed at Cambridge. The Cambridgians mentioned by Keynes were at the time influenced by a young Austrian philosopher who had resided at Cambridge from 1911 to 1913 and who had made a strong impression on, among others, Russell, Moore and Keynes: Ludwig Wittgenstein. Elected Apostle in November 1912, he was unable to tolerate the group's atmosphere and decided to leave before the year's end, which did not prevent him from rising to the status of 'angel' on his return to Cambridge in 1929.[15] Voluntarily enlisted in the Austrian army during the War, he wrote on the front and during military leave what he presented to Russell as 'a book called 'Logisch-Philosophische Abhandlung' containing all my work of the last six years. I believe I've solved our problems finally' (letter from 13 March 1919, in Wittgenstein 1974, p. 68).[16] He finished in August 1918, two months before being taken prisoner in Italy, the only book that would be published in his lifetime, in 1922, under the title *Tractatus Logico-Philosophicus*, a title suggested by Moore in reference to Spinoza's *Tractatus Theologico-Politicus*.[17] He claimed to have solved in this work both the main questions of logic and philosophy. In June 1919 he sent a copy to Russell and thus summarized its central message in a letter from 19 August: 'The main point is the theory of what can be expressed (gesagt) by propo [sition]s – i.e. by language – (and, which comes to the same thing, what can be thought) and what can not be expressed by prop[osition]s, but only shown (gezeigt); which, I believe, is the cardinal problem of philosophy' (ibid., p. 71). Ramsey was one of the two English translators of this work which would leave its mark on modern philosophy and contribute, by its description of metaphysical statements as meaningless, to the birth in Vienna of logical positivism, from which Wittgenstein would soon distance himself. By putting into question the existence of obvious truths, by affirming that philosophy could not claim to attain reality, by writing that necessary truths are meaningless tautologies, Wittgenstein called radically into question some of Moore's central ideas, as well as ideas of those whom he inspired, such as Keynes. For Wittgenstein, logic is unable to describe the truth or ethics the good. By questioning the relationship between language and reality, he contributed to the philosophy of language and to the constructivist view which would be developed during the last decades of the 20th Century. For Wittgenstein, philosophy becomes a critique of language; thought is language.

Wittgenstein, for whom delicacy in interpersonal relations was not his first quality, wrote to Keynes from Cassino, where he was taken prisoner, 12 June 1919: 'Please kindly forward the enclosed letter to Russell's address. I wish I could see him somehow or other, for I am sure he won't be able to understand my book without a very thorough explanation, which can't be written. Have you done any more work on probability? My M-S. contains a few lines about it which, I believe, solve the essential question' (Wittgenstein 1974, p. 112). This remark did not seem to upset Keynes any more than Ramsey's criticism. To the extent that he could remorselessly crush and humiliate an individual he considered mediocre, he also respected those

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[15]It was again Keynes who would organize Wittgenstein's reintegration into the Society's ranks.
[16]He began this work in 1911 at Cambridge and continued it in the Norwegian village in which he found solitary refuge in October 1913. He would go back to Norway in August 1936, living in an isolated house which he had built for himself near a lake.
[17]The first German version had been published in 1921 under the title *Logisch-Philosophische Abhandlung*, but Wittgenstein was horrified by this edition, which he qualified as 'pirated'. From then on he considered the 1922 English version as the first true edition of his book.

who he judged of superior intelligence. Such was manifestly the case with Wittgenstein, regarding whom he wrote to Lydia Lopokova on 4 May 1924: 'I have a letter from Frank Ramsey about the mad philosopher genius Wittgenstein. It seems that three of his brothers have committed suicide; so perhaps it is better not to be so wise and to be unphilosophical'. When Wittgenstein announced his imminent arrival in Cambridge, Keynes wrote on 18 November 1928 to his future wife: 'He . . . wants to come to stay with me here in about a fortnight. Am I strong enough? Perhaps if I do no work between now and then, I shall be'. After his guest's arrival, he wrote on 18 July 1929: 'Well, God has arrived. I met him on the 5.15 train. He has a plan to stay in Cambridge permanently. I see that the fatigue is going to be crushing. But I must not let him talk to me for more than two or three hours a day'. On the 20th he added: 'I would willingly exchange my guest for yours! – though we are really getting on very well and I must not complain. Sometimes it's almost unbearable the fatigue'.

In fact, Keynes had been for some time Wittgenstein's protector, the latter having renounced his father's enormous inheritance. He intervened so that he could correspond, receive and send manuscripts while he was prisoner in Italy in 1919. He paid for the trips that allowed Ramsey to meet him in the Austrian villages where he taught primary school in the 1920s. He sent money to help him get to Cambridge in 1925, where he stayed at a country house in Iford, near Lewes, that the newly wedded Keynes had rented for the summer.[18] He organized his return to Cambridge in 1929 and, himself an elector, was the main advocate of Wittgenstein's election as successor to Moore to the chair of moral philosophy in 1939. He also helped him in the process of obtaining British citizenship.

Keynes and Wittgenstein met on numerous occasions after the latter's return to Cambridge.[19] The content of these discussions is unknown, but it is possible that Keynes was among the first to assist in the transformations of Wittgenstein's philosophic vision, in the reevaluation of logical positivism and in the development of the theory of language games. Language was henceforth understood as a social practice, language games a new philosophical technique designed to clarify the grammar of our statements. Some believe that Wittgenstein's 'second philosophy', particularly in regards to the role played by rules and conventions in relation to individual intuition, had a significant influence on the Keynes of *The General Theory*.[20]

Keynes's response

It was only after Ramsey's death that Keynes publicly responded to his critics and recognized in part their legitimacy in regards to the subjective nature of probabilities:

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[18]To Sheppard, one of their numerous guests in this house, Keynes wrote on 22 August: 'Wittgenstein is here! He came two days later than I expected with the result that he will still be here until Wednesday. I think he would drive you mad. So it would be much better if you didn't come until Wednesday. But if it suits you better to come on Tuesday, I daresay that would be all right and that you could survive the one day' (J. T. Sheppard Papers, JTS/2/112).

[19]On relations between Keynes and Wittgenstein, see, in addition to the correspondence reproduced in Wittgenstein (1974), Coates (1996) and Monk (1990). For the latter, the two men did not have as close a friendship as, for example, there existed between Wittgenstein and Sraffa, which suited Keynes for ' being Wittgenstein's friend demanded more time and energy than he was able to give' (Monk 1990, p. 262). A memorable lunch brought together Ramsey, Wittgenstein, Sraffa and Keynes to discuss the *Treatise on Probability* (Newman 1987, p. 42).

[20]See Favereau (1985), Davis (1994) and Lavialle (2001). Wittgenstein indicated, in the Preface of his posthumous *Philosophical Investigations*, that criticisms from the economist Piero Sraffa, a close friend of Keynes, constituted the most important stimulation for his work. Sraffa and Wittgenstein met for discussion at least once per week, from the beginning of the 1930s until 1946. Sraffa then decided, to Wittgenstein's great dismay, to put an end to these meetings. On these two authors' relations, see Marion (2005).

Thus the calculus of probabilities belong 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 to us merely by human 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. (1931-26, p. 339)

Nevertheless, recognizing the important progress made by Ramsey and Wittgenstein in the field of formal logic in regards to Russell's first works, Keynes believed that 'the gradual perfection of the formal treatment . . . had been, however, gradually to empty it of content and to reduce it more and more to mere dry bones, until finally it seemed to exclude not only all experience, but most of the principles, usually reckoned logical, of reasonable thought' (ibid., p. 338). While Wittgenstein came to see philosophy as a sort of non-sense, Ramsey arrived at a pragmaticism that was repugnant to the former. Keynes was not ready to admit that all his first philosophical intuitions were to be rejected. Even though religious and political certitudes disappeared with the war, this was no reason to abandon all common goals, all objective principles, he wrote in the last of a series of articles he edited for the *Manchester Guardian Commercial*: 'Progress is a soiled creed black with coal dust and gunpowder; but we have not discarded it. We believe and disbelieve, and mingle faith with doubt . . . Our newest Spinoza gives us frozen comfort' (1923-3, pp. 448-49). He quoted a passage of the *Tractatus*, whose arguments he tried unsuccessfully to explain to the Apostles in November 1925: 'Last night, I tried to explain the philosophy of Ludwig to my Society, but it escapes my mind – I could only half remember it' (letter to Lydia, 15 November 1925).

He wrote to Wittgenstein on 29 March 1924 that he waited a year before responding to the latter's letter because he wanted to succeed in understanding his book 'yet my mind is now so far from fundamental questions that it is impossible for me to get clear about such matters. I still do not know what to say about your book, except that I feel certain that it is a work of extraordinary importance and genius' (Wittgenstein 1974, p. 116). On *A Treatise on Probability* which he sent him at the same time, he wrote: 'I fear you will not like it' (ibid.), a fear that was not unjustified. Wittgenstein had a better appreciation for Keynes's political economic works, particularly the *Economic Consequences of the Peace* and *A Short View of Russia*.

In his obituary note on Ramsey, Keynes wrote that he exchanged 'the tormenting exercises of the foundations of thought and of psychology, where the mind tries to catch its own tail, for the delightful paths of our own most agreeable branch of the moral sciences, in which theory and fact, intuitive imagination and practical judgment, are blended in a manner comfortable to the human intellect' (1930-6, p. 335). Let us now turn to these moral sciences.

Alcoholism and alchemy: the critique of statistical inference

The fifth and last part of *A Treatise on Probability*, composed of five chapters, is devoted to statistical inference. Its contents were almost entirely elaborated after the 1907 and 1908 dissertations, which end with a chapter devoted to the relations between ethics and probabilities. In the book, this chapter, the 26th, 'The Application of Probability to Conduct', from which this chapter's first quotation was taken, precedes Part Five. For Keynes, statistics fulfill two functions. The first role is descriptive, consisting of numerical and graphic techniques used to describe in a condensed manner certain determinant characteristics of large sets of phenomena. The second function is inductive: 'It seeks to extend its description of certain characteristics of

observed events to the corresponding characteristics of other events which have not been observed' (1921-1, p. 359). It is this second function that he calls statistical inference. It is founded on Bernoulli's theorem on *a priori* probabilities, which allows us to deduce 'general laws amongst masses of phenomena, in spite of the uncertainty of each particular case' (ibid.,, p. 369). Keynes did not believe there was 'any direct and simple method by which we can make the transition from an observed numerical frequency to a numerical measure of probability' (ibid., p. 400). He had already expressed his skepticism in this regard in the second version of his dissertation by underlining the danger of applying this method to political questions: 'Statistical-correlation affords a valuable method of summarizing a certain kind of evidence. But we must not incautiously accept conclusions which depend on nothing but the observation of high statistical-correlation, when they are offered in solution of practical problems of politics or science' (1908-4, p. 252).

In every set of events, including in the natural world, possible contingencies are too numerous to allow for exact and certain conclusions: 'Although nature has her habits, due to the recurrence of causes, they are general, not invariable' (1921-1, p. 402). Keynes quotes approvingly a passage from Leibniz, demanding 'not so much mathematical subtlety as a precise statement of all the circumstances' (ibid.). Statistics arise from observation: 'The ultimate basis of the theory of statistics is thus not mathematical but observational' (ibid., p. 413). It is only in very limited cases that one can apply 'mathematical methods to the general problem of statistical inference' (ibid., p. 419). Keynes considers that among the great statisticians, Whilhelm Lexis, Ladislaus von Bortkiewicz and Alexander Tschuprow were conscious of the problems that he raised raised. Others are 'the children of loose thinking, and the parents of charlatanry' (ibid.). The claim to be able to exactly measure the probability of an induction and to proclaim the certainty of our predictions would have been universally rejected long ago, in the majority of cases, 'if those who made it had not successfully concealed themselves from the eyes of common sense in a maze of mathematics' (ibid., p. 424). Such are the ideas Keynes would use in a series of methodological debates which would place him in opposition to a number of his contemporaries from the writing of his dissertation until his death.

After having been named a fellow of King's College on 16 March 1909, Keynes started on a paper on price indexes, a subject with which he had already dealt in the first essay he wrote for Marshall as an economics student in 1905. He finished this long paper while vacationing in Versailles between the 7th and 21st of April 1909 and submitted it to a competition for the Adam Smith prize, which he won. Unpublished until the release of the *Collected Writings*, 'The Method of Index Numbers with Special Reference to the Measurement of General Exchange Value' (1909-4), would in part be used in the *Treatise on Probability* and the *Treatise on Money*.[21] Inspired by his reflections from 1904 on knowledge and probabilities, this paper deals with the methodological problems linked to the nature of quantities in economics and to their measurement, but it applies to all social sciences, where elements are measurable with great difficulty. Keynes soon had occasion to use his reflections in a controversy with Pearson, which he had already criticized in his dissertation.

Keynes against Pearson

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[21]Keynes would publish from this the second appendix under the title 'The Principal Averages and the Laws of Error Which Lead to Them' in the *Journal of the Royal Statistical Society* (1911-2).

Economics was only one of many of statistical inference's fields of application. This method spread from the middle of the 19th Century, at the same time as a determinist vision gave way to a probabilistic world vision, in both the natural and social domains. Francis Galton, Francis Y. Edgeworth, George U. Yule and Karl Pearson figured among those who made the most important contributions to the use of statistics in the social sciences.

In May 1910, the Francis Galton Laboratory for National Eugenics published a report prepared by Ethel M. Elderton with the assistance of Karl Pearson, dealing with the influence of parental alcoholism on the physical and intellectual characteristics of children, and based on population samples from Manchester and Edinburgh. Counter to the general intuition, the report concluded that there was no significant relation between the two sets of data. In short, children of alcoholics were not more disadvantaged than the others from the start. This study, summarized in *The Times* for 21 May, unleashed a lively controversy in the newspapers, Pearson, Keynes and Marshall being its main protagonists. Marshall, who believed in the evils of alcohol and the importance of parental influence, wrote a letter to *The Times* on 'Alcoholism and efficiency', published on 7 July, to which Pearson answered on 12 July. In his letter, Marshall hoped that someone more competent than himself would criticize the methodology of the study. This is what Keynes engaged in. He sent two letters to *The Times*, which were not published (1910-3, 1911-1). He published a review of the study in the July edition of the *Journal of the Royal Statistical Society* (1910-4). Marshall published a second letter in *The Times* of 2 August, drawing on Keynes's writings, to which Pearson answered on 10 August. Marshall intervened for the last time on 19 August, affirming that Pearson did not show conclusively that parental alcoholism has no effect on children's degeneration. Pearson answered Keynes, as well as Marshall, in September in a 26-page supplement to the report, subtitled: 'A Reply to the Cambridge Economists'. Keynes replied in a letter to the *Journal of the Royal Statistical Society* in December (1910-7), and he responded in February 1911 (1911-3) to a last intervention by Pearson in January, in which he wrote about Marshall's preconception in this debate.

Keynes's attack was directed at the use made of statistics by the report's authors and is based on the main conclusions of his dissertation on probabilities. The appreciation of probabilities, of the weight of arguments, of risk, must be based on judgment, which brings us to choose, define, and classify data according to our intuitions. It is not a question of facts, but of the nature and validity of the arguments employed. Now, Elderton and Pearson's conclusions go totally against judgment and common sense. It is known for example, according to Keynes, that alcoholism seriously diminishes potential income. The arguments on which the study is founded concluding definitively that the environment has little influence on an individual's character are both insufficient and poorly constructed, despite all their useless efforts at statistical compilation. The following is an obvious example 'of the application of a needlessly complex mathematical apparatus to initial data, of which the true character is insufficiently explained, and which are in fact unsuited to the problem in hand' (1910-4, p. 195) : 'The methods of the trained anthropometrical statistician need applying with much more care and caution than is here exhibited before they are suited to the complex phenomena with which economists have to deal' (ibid, p. 205).

The vigour of Keynes's attack is doubtless the result, not only of methodological considerations, but also of his prejudices, anchored in the Victorian universe and the 'presuppositions of Harvey Road', according to which alcoholism in the lower classes was a hereditary defect. He had much admiration for the economist Irving Fisher, who campaigned against alcohol consumption, and himself even juggled with the idea of forbidding alcohol consumption: 'I expect that the prohibition of alcoholic spirits and of bookmakers would do good' (1925-17, p. 303).

Keynes against Tinbergen

Some elements of the debate with Pearson reappear nearly 30 years later in a controversy which opposes the now famous economist to one of the founders of econometrics, Jan Tinbergen. In a long study of theories of cycles appearing in 1935 in the journal of the new Econometric Society, Tinbergen qualifies the systems of Keynes and Hayek as 'open systems' which do not lend themselves well to mathematical translation, even if one can formulate certain hypotheses and relations with mathematical precision. The number of variables discussed is superior to the number of relations which are exposed precisely and explicitly (Tinbergen 1935, p. 264).[22] Tinbergen opposed this type of system with 'some business cycle theories that form macro dynamic closed systems and are formulated mathematically' (ibid., p. 268). His own work, like that of Frisch and Kalecki, is a part of this second group, which represented for Tinbergen the way of the future.

At the League of Nations' request, at the end of the 1930s, Tinbergen undertook an empirical testing of business cycle theories. The results were published in 1939 in two volumes, the first of which presented his method of empirical testing and the second the first macroeconomic model of the American economy (Tinbergen 1939). Keynes was asked to comment on Tinbergen's first book. His reaction was virulent and gave birth to a severely critical account in *The Economic Journal* (1939-9), to which Tinbergen would reply (1940) before a final blow from Keynes (1940-3). Tinbergen's econometrician colleagues, particularly Koopmans (1941) and Haavelmo (1943), would take up their pens to denounce Keynes's incomprehension of the new discipline. Keynes was effectively engaging himself in a virulent attack against the practice of econometrics such as it would be developed, as well as the misuse of statistics in economics and the social sciences in general.

For Keynes, the problem was fundamentally methodological in origin. He rejected 'the logic of applying the method of multiple correlation to unanalyzed economic material, which we know to be non-homogeneous through time' (letter to R. Tyler, 23 August 1938, JMK 14, p. 286). He reproached Tinbergen for postulating that the future state of an economy can be calculated as the resultant of past statistics. As a result, the uncertainty which constitutes an essential element of economic and social reality disappears from sight and non-quantifiable factors 'such as inventions, politics, labour troubles, wars, earthquakes, financial crises" (ibid., p. 287), what he calls in his article 'political, social and psychological factors' (ibid., p. 309), cannot be taken be taken into account. He described Tinbergen's book to Kahn as 'such a mess of unintelligible figurings' (letter from 23 August 1939, JMK 14, p. 289). He wrote to Harrod on 21 September that 'the whole thing is charlatanism in spite of T.'s admirable candour' (ibid., p. 305).

Of all economic problems, that of business cycle was for Keynes the least suited to statistical and mathematical treatment. This dismissal holds particularly in the case of investment determination. But more generally, Tinbergen's error, in Keyne's view, was to apply to economics methods of analysis conceived for other objects. Economic data lack the required permanence and stability for successful implementation. One cannot draw up an exhaustive list of causal factors of a given situation. Several fundamental elements simply cannot be measured. Even if this were the case, units of measurement are not necessarily homogenous. When an effect can in turn react on the cause, one comes up against fallacious correlations and insoluble complications. In his model, Tinbergen is forced to postulate among his variables a linear

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[22]The *Treatise on Money* is being referred to here and not *The General Theory*, which had not yet been published. But this comment applies equally to the latter work.

dependency which does not correspond to reality: 'indeed, it is ridiculous' (1939-9, p. 312). Keynes's conclusion that 'the successful application of this method to so enormously complex a problem as the business cycle does strike me as a singularly unpromising project in the present state of our knowledge' (ibid., p. 317) is hardly surprising.

It is significant that one finds here one of Keynes's rare public allusions to his first research into probabilities. Reproaching Tinbergen for preferring the labyrinths of arithmetic to those of logic, he described himself as someone whose tastes in statistical theory followed the opposite path (ibid., p. 307). And more explicitly, he added: 'Thirty years ago I used to be occupied in examining the slippery problem of passing from statistical description to inductive generalization in the case of simple correlation; and today in the era of multiple correlation I do not find that in this respect practice is much improved' (ibid., p. 315). In his response to Tinbergen's polite reply, Keynes wrote that he doubted 'that this brand of statistical alchemy is ripe to become a branch of science . . . But Newton, Boyle and Locke all played with alchemy. So let him continue.' (1940-3, p. 320).

In praise of statistics

Keynes's criticism of Tinbergen's econometrics did not prevent him from associating with the institution of econometrics from its beginnings, six or seven years earlier. In 1933 he accepted participation in the group of the 30 founders of the Econometric Society, before being appointed a member of its board the following year. He also sat on the board of editors of *Econometrica*, the Society's journal. And finally he became the Society's president in 1944-1945. This mixture of rejection and participation illustrates the complexity of the man.

The Society was defined in its founding document as 'an international society for the advancement of economic theory in its relation to statistics and mathematics. . . . Its main object shall be to promote studies that aim at a unification of the theoretical-quantitative and the empirical-quantitative approach to economic problems and that are penetrated by constructive and rigorous thinking similar to that which has come to dominate in the natural sciences' (quoted in *Econometrica*, vol. 1, 1933, p. 1). Now, Keynes agreed at least in part with this objective. He considered that statistics had an important role to play in the description of phenomena, in economics as elsewhere. And during his whole career, he never stopped fighting for improvements in methods of statistics collecting. Statistical data abound in his writings. On 18 December 1908 he confided to Duncan Grant while he was composing his first academic article on the Indian economy, that the production of statistics 'makes me into a tremendous state of excitement – like the excitement of the scientist who watches the result of his experiments. . . . Nothing except copulation is so enthralling' (BL, 57930A). There is in Keynes's involvement with statistics a psychological dimension. He inherited from his father the habit of keeping accounts of everything: finances, work hours, hours of reading, game results. He even attempted a complex register using statistical means of his sexual activities.[23]

He never stopped, alone and with other colleagues in the 1920s and 1930s, complaining about the dearth of statistical data on the British economy, in comparison with the situation in the United States, where the National Bureau of Economic Research (NBER), founded by Wesley Clair Mitchell in 1920, and other institutions, were carrying out this task. In 1919 he signed a Royal Statistical Society petition destined for the Prime Minister calling for an inquiry into methods of statistics collection and presentation.

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[23]See KP, PP/20A, partially reproduced in the figures 9 and 10 of Moggridge (1992).

Informing the public with the most complete and reliable information possible constituted one of the important elements of Liberal programme with which he opposed, in the 1920s, that of the Conservatives. Statistics appeared to him as an essential instrument for the rational mastering of the economy. It was in response to this need that he established in 1923 with his colleagues Hubert Henderson, William Beveridge and Arthur Bowley, the London and Cambridge Economic Service, which attempted, at a time when nothing resembling statistical series existed, to make available to businessmen information helping them to make their decisions. This project was similar to the objective pursued by Wesley Clair Mitchell and his colleagues at the National Bureau of Economic Research on the other side of the Atlantic. The group established by Keynes and his associates elaborated new economic indicators and presented them in tables and graphs in monthly bulletins and special reports. Actively implicated in the work of the Service until 1938, Keynes composed seven detailed memorandums on stocks of staple commodities (JMK 12, pp. 267-647).

Keynes led his crusade in favour of collecting statistics in the 'liberal yellow book', *Britain's Industrial Future*, published in January 1928 in view of the following year's elections. In the Macmillan Committee report of 1931 and of which he was one of the main contributors, he called for the establishment of a system of public statistics. He pursued his campaign in the Economic Advisory Council alongside Colin Clark, a pioneer with Simon Kuznets in the establishment of national accounts statistics. In 1931 the Prime Minister Macdonald formed a Committee on Economic Information, linked to the Economic Advisory Council. In 1938 Keynes was appointed member of the council and governor of the new National Institute of Economic and Social Research. The following year he wrote to the Institute's director Noel Hall that it was urgent to pressure the government into collecting statistics not yet gathered in an adequate manner (Stone 1978, p. 84). This institute established the Cambridge Research Scheme, presided over by Keynes, who undertook detailed statistical research with the intention of studying the process of England's economic transformation.

The General Theory contains a few statistical data, taken from the works of Clark and Kuznets, with which Keynes sought to illustrate some of his intuitions, particularly those relative to the size of the multiplier. The concepts elaborated by Keynes—the consumption function, the investment function, the multiplier, money demand—call for statistical testing and constitute a framework for national accounts. Economists rapidly began working on this. Keynes contributed himself in his book *How to Pay for the War*, published in 1940. To support his proposals to finance the war, he estimated the income potential of Great Britain with his statistical assistant Erwin Rothbarth and published the results in the December 1939 issue of *The Economic Journal* (1939-14).

From 1940, Keynes was closely associated with the British war effort and in particular with all its economic aspects, including the conditions of post-war reconstruction. The same year in June, James Meade, a close friend of Keynes, entered into the service of the war cabinet's Economic Information Service and began working on drawing up tables of national accounts in the analytic framework provided by Keynes. He was joined by Richard Stone in August, and the two men sent their work to Keynes in December. Keynes was enthusiastic and it was in 1941 that the famous White Book on the budget containing an analysis of the financial sources for the war, written by Keynes, and tables of national income and expenditures prepared by Meade and Stone, was published. For many this date marks the true beginning of the Keynesian revolution in Great Britain.

When the White Book on Employment Policy was published in 1944, Keynes wrote that 'the new era of "Joy with statistics" (I do not write ironically) can begin. Theoretical economic analysis has now reached a point where it is fit to be applied' (1944-1, p. 371). At the same time

the Department of Applied Economics at Cambridge was founded. This department, whose creation Keynes proposed in 1939, focused on quantitative economics. Here is how the first director of the new department, Richard Stone, describes Keynes's attitude to econometrics:

> His ambivalence on the role of theory and his hostility to the use of mathematics in economics were the outcome, I think, of his background and early experiences and reflect the critical bystander in him. With his rhetorical style there is no difficulty in finding overloaded, not to say outrageous, quotations. But they are representative of the young self ; the actions of the old self belie them. Despite many hard words, there is no doubt in my mind that he should be counted among the benefactors of econometrics' (Stone 1978, p. 88).

Economics: moral science, art and discourse

Keynes wrote little on the nature and method of economic sciences. His main reflections are found in letters, in brief passages in his books, particularly in his criticisms of classical economics. His implict positions can be deduced from some of the writings we have discussed in the present chapter. A first conviction, affirmed very early and constantly repeated, is that economics must not be confused with physical sciences. It is a social science or, to use an older designation, a moral science:

> I also want to emphasize strongly the point about economics being a moral science. I mentioned before that it deals with introspection and with values. I might have added that it deals with motives, expectations, psychological uncertainties. . . . It is as though the fall of the apple to the ground depended on the apple's motives, on whether it is worth while falling to the ground, and whether the ground wanted the apple to fall, and on mistaken calculations on the part of the apple as to how far it was from the centre of the earth. (Letter to Harrod, 16 July 1938, JMK 14, p. 300).

Keynes was convinced of the fact that methods used in the physical sciences cannot be applied to the moral sciences: 'It seems to me that economics is a branch of logic, a way of thinking; and that you do not repel sufficiently firmly attempts à la Schultz to turn it into a pseudo-natural science. . . . economics is essentially a moral science and not a natural science. That is, it employs introspection and judgments of value' (Letter to Harrod, 4 July 1938, JMK 14, pp. 296-297). Keynes discusses here to the presidential discourse that Harrod was to present in August 1938 to the F section of the British Association for the Advancement of Science entitled 'Scope and Method of Economics', and published in the September edition of *The Economic Journal*. Harrod responded to him on July 6th : 'I am not sure that I agree altogether with your hostility to the idea of economics as a natural science' (quoted in JMK 14, p. 297). Unanimity was far from being the rule on this point in the Keynesian camp.

In the moral sciences, the unit of analysis is the human being, acting within the fog of history. The economist works with material that is 'in too many respects, not homogeneous through time" (letter to Harrod, 4 July 1938, JMK 14, p. 296), with judgements of value, such that the distinction, formulated by his father John Neville, between positive and normative economics must be rejected. Time occupies a central place. The future is uncertain and undetermined. Anticipation, anguish and fear play a crucial role, as we will see in Chapter 5, in the analysis of currency and the preference for liquidity. One observes as early as Keynes's first writings the rejection of determinism, the conviction that movement constitutes the essence of social and

human reality, the belief in the transitory nature of life and states of mind, in the precariousness of human and social realities. These ideas were by no means unique to Keynes. They were shared by, among others, his Bloomsbury friends.

The consequences, even immediate, of our actions cannot be predicted with certitude. Now one finds in economics that results occur 'at at comparatively distant, and sometimes at an *infenitely* distant, date' (1937-4, p. 113), which makes this discipline particularly unsuited to treatment by methods from the natural sciences:

> Actually, however, we have, as a rule, only the vaguest idea of any but the most direct consequences of our acts. . . . Now of all human activities which are affected by this remoter preoccupation, it happens that one of the most important is economic in character, namely wealth. The whole object of the accumulation of wealth is to produce results, or potential results, at a comparatively distant, and sometimes at an *indefinitely* distant, date. Thus the fact that our knowledge of the future is fluctuating, vague and uncertain, renders wealth a peculiarly unsuitable subject for the methods of the classical economic theory. (1937-4, p. 113)

Uncertain knowledge, Keynes states in this methodological postscript to his *General Theory*, must not be confused with what allows for the distinction between the certain and the probable.

> The game of roulette is not subject, in this sense, to uncertainty; nor is the prospect of a Victory bond being drawn. Or, again, the expectation of life is only slightly uncertan. Even the weather is moderately uncertain. The sense in which I am using the term is that in which the prospect of a European war in uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability. We simply do not know. (1937-4, pp. 113-14).

In *The General Theory*, he wrote regarding the uncertainty which characterizes the taking of economic decisions and particularly the decision to invest, which cannot be founded on a rational calculation of costs and benefits: 'By "very uncertain" I do not mean the same thing as 'very improbable'" (1936-1, p. 160).

We must nevertheless act, in economics as in life's other domains 'in a manner which saves our faces as rational, economic men' (1937-4, p. 114). This we do by assuming that the present is a good guide for the future, that the present state of opinion is based on correct future prospects and by conforming to the behaviour of the majority: 'The psychology of a society of individuals each of whom is endeavouring to copy the others leads to what we may strictly term a conventional judgment' (ibid.). Now this is a 'flimsy foundation, . . . subject to sudden and violent change' (ibid.). What goes on in the real world is not the outcome of processes envisaged by orthodox economic theory:

> New fears and hope will, without warning, take charge of human conduct. The forces of disillusion may suddenly impose a new conventional basis of valuation. All these pretty, polite techniques, made for a well-paneled board room and a nicely regulated market, are liable to collapse. At all times the vague panic fears and equally vague and unreasoned hopes are not really lulled, and lie but a little way below the surface.

. . . I accuse the classical economic theory of being itself one of these pretty, polite techniques which tries to deal with the present by abstracting from the fact that we know very little about the future. (1937-4, pp. 114-115).

Moreover, this theory postulate a illusory being that exists only in the mind of those who conceive it. This character is the *homo œconomicus* of Bentham's imagination and has become, according to Keynes, the cornerstone of the utilitarianism which constitutes the implicit philosophy of economists. For Bentham, man's behaviour is influenced by calculating pleasure and pain, advantages and disadvantages 'supposed to be capable of reducing uncertainty to the same calculable status as that of certainty itself' (ibid., p. 113). Classical economists do not see 'how far the initial assumptions of the marginal theory stand or fall with the utilitarian ethics and the utilitarian psychology' (1926-10, p. 260). Keynes opposes this vision with one in which beings are motivated by their instincts, impulses, their 'animal spirits': 'a large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation, whether moral or hedonistic or economic' (1936-1, p.173).

Causality and modelization

Yet one should not content oneself with stigmatizing the impotence of orthodox economic theory, but try to explain what happens in reality. Keynes attempted to do this in a number of writings destined for both the lay person and the theoretician or specialist. Here again, he did not explain his method at length, but rather put it into practice. It is based primarily on what he called, borrowing approvingly a formulation of Harrod, 'a vigilant observation of the actual working of our system' (letter from 4 July 1938, JMK 14, p. 296). One must start with contemporary reality.[24]

Keynes opposed the conception of the economy in terms of a general atemporal equilibrium, which gradually became dominant in the twentieth century, with an approach in terms of causality inscribed in historical time. Historical time is opposed to the logical time of physics. History is irreversible. The past is bygone. Economic analysis must be based on a given concrete situation in which agents are constrained by the results of decisions made in the past. This is the case, for example, for investment spending. The past cannot be erased at each new phase in the development of an economy.

One of the main instruments of analysis is the model: 'Economics is a science of thinking in terms of models joined to the art of choosing models which are relevant to the contemporary world' (letter to Harrod, 4 July 1938, JMK 14, p. 296). Constructing models involves 'segregat[ing] the semi-permanent or relatively constant factors from those which are transitory or fluctuating so as to develop a logical way of thinking about the latter, and of understanding the time sequences to which they give rise in particular cases' (ibid., pp. 296-97). Progress in economics involves gradual improvements in the choice of models. Keynes considers the art of choosing good models a talent with which few are endowed. It is safe to say that he considered himself among such a happy few that were favorably endowed.

A model does not involve the juxtaposition of separate and independent atoms. It is an organic unity. The characteristics, particularly those quantifiable, of the unity are not the sum of the characteristics of its elements: 'The atomic hypothesis which has worked so splendidly in physics

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[24] Keynes would thus be radically opposed Friedman's vision, according to which the realism of a scientific theory's hypotheses is of no importance so long as empirically testable predictions can be deduced from them (Friedman 1953).

breaks down in psychics' (1926-10, p. 260). This organic vision is manifest, in the *General Theory*'s model for example, in the paradox of savings, according to which the attempt by people to increase the savings taken from their individual income translates into a decrease in effective demand leading to a decrease in national income and thus a decrease in global savings. Keynes had already underlined, in 'Miscellanea Ethica' from 1905, the difficulties created by organic unities in economics. Utility is thus a part of this class of qualities for which the value of the whole differs from the value of its parts. In the second version of his dissertation on probabilities, Keynes shows how this notion allows one to justify a more egalitarian distribution of incomes, about which he would return later with his theory on the propensity to consume: 'It is at the root of all principles of equality. It is behind the numerous arguments that an equal distribution of goods is better than a very unequal distribution. If this is the case it follows that, the sum of the goods of each part of a community being fixed, the organic good of the whole is greater the more equally the goods are divided amongst the part' (1908-4, pp. 352-53).

Numbers and intuition

For a model to be useful and generalizable, Keynes felt it is not enough to replace variables with real values. The utility of statistics 'is not so much to fill in missing variables with a view to prediction, as to test the relevance and validity of the model' (letter to Harrod, 4 July 1938, JMK 14, p. 296). Statistics are for Keynes undeniably important, useful and, as we have seen, even amusing. But they do not play in his economic vision the same role as in econometrics and more generally in mathematical economics. For Keynes, statistical data are essential for helping businessmen, union leaders, and governments to make enlightened decisions. But they can in no way allow them to predict with certitude the results of alternative decisions. In what concerns economic theory, statistics can illustrate models, but they cannot, according to Keynes, allow for their transformation into instruments of prediction. Transforming an economic model into a quantitative formula destroys its utility (ibid., p. 299). In addition to the misuse of statistics, Keynes condemns the 'symbolic pseudo-mathematical methods of formalizing a system of economic analysis' (ibid., p. 297) : 'Too large a proportion of recent 'mathematical' economics are merely concoctions, as imprecise as the initial assumptions they rest on, which allow the author to lose sight of the complexities and interdependencies of the real world in a maze of pretentious and unhelpful symbols' (ibid., p. 298).

In choosing sensible models, intuition, imagination and the researcher's common sense should play the main role. On Keynes's intuitive approach, Austin Robinson gave the following surprising explanation: 'For I have long felt that Keynes' economic thinking was, in reality, intuitive, impressionistic, and in a sense feminine rather than precise, ordered, and meticulous' (A. Robinson 1964, p. 90). Many economists have reproached Keynes in the same way for his lack of theoretical rigor. Keynes believed that his approach was that of all great scientists, including those in the natural sciences. The following three examples show that his position on this subject did not change from his early philosophical writings to the end of his life.

In *A Treatise on Probability*, Keynes wrote that it was neither through logical process nor statistical inference but rather through intuition that Darwin arrived at his hypothesis that all living species evolved from a few primitive forms into which life was first breathed: 'Not only in the main argument, but in many of the subsidiary discussions, an elaborate combination of induction and analogy is superimposed upon a narrow and limited knowledge of statistical frequency. And this is equally the case in almost all everyday arguments of any degree of

complexity' (1921-1, pp. 118-119). The long term natural evolution studied by Darwin cannot be submitted to laboratory tests or described by means of demonstrative logic.

In an open letter, signed 'Siela', Keynes praises the genial scientific imagination that allowed Freud to put forth a series of innovative ideas, ideas founded on intuition and experience. He writes that the validity of Freud's hypotheses depends very little on inductive verifications: 'I venture to say that at the present stage the argument in favour of Freudian theories would be very little weakened if it were to be admitted that every case published hitherto had been wholly invented by Professor Freud in order to illustrate his ideas and to make them more vivid to the mind of the reader' (1925-19, p. 393).

One of Keynes's last writings deals with Newton, several of whose manuscripts he acquired in 1936. In it he continued to develop his argument on the primordial role of intuition in scientific work, including the field of 'hard science'. Newton's experiments 'were always, I suspect, a means, not of discovering, but always of verifying what he knew already' (1947, p. 366). And he concludes that the gap so many others see between Newton's alchemical investigations and his serious scientific work does not exist. For Newton as for Freud, for Darwin so for Keynes, intuition rather than induction is the first step in the process of knowledge.

In short, even if, according to some scholars, Keynes's epistemological position can be qualified as realist, it certainly cannot be associated with empiricism, any more than with pragmatism, according to which the value of a theory is linked to the value of its results, of the predictions that are deduced from it. Instrumentalism, which is derived from the latter, strongly marked from the 1930s on the standard economic theory from which Keynes increasing distanced himself.

Art and language

Explaining to his mother the disappointment he felt at the publication of his *Treatise on Money*, Keynes warned her that 'Artistically it is a failure' (JMK 13, p. 176). In a paper written for the Apostles Society in 1909 (1909-2), he wrote that if talent had been given to him, he would have preferred to have been an artist than a man of science. But, according to him, there are more similarities than differences between the artistic and the scientific ways of apprehending reality, and he sometimes defined economics as an art. In particular, imagination and intuition belong to both worlds. The world described in works of art and literature, like those dealt with by biographers and psychologists, is a changing, unstable world, one in which the most important decisions are made in uncertainty. It is a world in which individual, subjective experiences are confused and fragmented, in which individuals are not lead by rationality. This vision of things applies to both everyday life and artistic creation, to social interactions and economic phenomena. For this reason, traditional scientific language cannot be applied to material with which he who seeks to describe society and the economy is confronted.

Moreover, language and reality, like form and content, do not constitute two separate entities, as Russell, Wittgenstein and several others have shown. Language is in reality and reality lets itself be seen through language. Beyond this there is a conception of the world, of society, of human beings, developed at the turn of the century in England and elsewhere, which is sometimes qualified as 'modernism' and whose defining characteristics we examined in the Interlude devoted to Bloomsbury. Art and literature transform in tandem the world they describe. Postimpressionism appeared as the form adapted to the new universe, like the narrative style developed by Proust, Joyce, Musil or Woolf. It was in this context that Keynes elaborated his own language. It constituted, by its form as much as its content, an instrument in his struggle to

transform social and economic reality. Virginia Woolf praised his literary talents by writing to him on 23 December 1937 regarding his note regarding her nephew Julian Bell, who died during the Spanish Civil War: "I liked the notice on Julian very much. . . . I wish you'd go on and do a whole portrait gallery, reluctant as I am to recognise your gift in that line when it seems obvious that nature gave me none to mathematics. Please consider it. Is portrait writing hard work compared with economics? (V. Woolf 1975-80, vol. 6, pp. 192-93).

References

Abbreviations

BL : British Library.
JMK : *The Collected Writings of John Maynard Keynes*, Londres, Macmillan, 1971-1989, 30 volumes.
JTS : J. T. Sheppard Papers, King's College, Cambridge.
KP : Keynes Papers, King's College Library, Cambridge.

Keynes's work

1904-3. [Ethics in relation to conduct], paper for the Apostles Society, 23 January; KP, UA/19/2.
1905-1. 'Miscellanea ethica', written 31 July - 19 September; KP, UA/21.
1907-1. 'Principles of Probability', submitted as Fellowship Dissertation to King's College, December ; KP, TP/A/1-2.
1908-4. 'Principles of probability', submitted as Fellowship Dissertation to King's College, 2 vols., December ; KP, MM/6.
1909-2 . [Science and art], paper for the Apostles Society, 20 February ; KP, UA/32.
1909-4. 'The method of index numbers with special reference to the measurement of general exchange value », written in April, winner of Adam Smith Prize; JMK 11, 49-156.
1910-3. Letter to *The Times*, 6 June, not published; JMK 11, 186-8.
1910-4. '*A First Study of the Influence of Parental Alcoholism on the Physique and Ability of the Offspring*, by Ethel M. Elderton with the assistance of Karl Pearson, London, Dulau, 1910', *Journal of the Royal Statistical Society*, vol. 73, July, 769-73 ; JMK 11, 189-96.
1910-7. Letter, *Journal of the Royal Statistical Society*, vol. 74, December; JMK 11, 196-205.
1911-1. Letter to *The Times*, 16 janvier, not published ; JMK 11, 206-7.
1911-2. 'The principal averages and the laws of error which lead to them', *Journal of the Royal Statistical Society*, 74, February, 322-31 ; JMK 11, 159-73.
1911-3. Letter, *Journal of the Royal Statistical Society*, vol. 74, February ; JMK 11, 207-16.
1921-1. *A Treatise on Probability*, London : Macmillan; JMK 8.
1923-3. 'The underlying principle', *Manchester Guardian Commercial*, Series of Supplements 'Reconstruction in Europe', no. 12, 4 January, 717-8 ; JMK 17, 448-54.
1925-17. 'Am I a Liberal?', *Nation and Athenaeum*, vol. 37, 8 and 15 August, 563-4, 587-8; JMK 9, 295-306.
1925-19. 'Freudian psycho-analysis', *Nation and the Athenæum*, vol. 35, 29 August, 643-4; JMK 28, 392-3. [letter to the editor, signed 'Siela']
1926-10. 'Francis Ysidro Edgeworth, 1845-1926', *Economic Journal*, vol. 36, March, 140-53 ; JMK 10, 251-66.
1930-6. 'Ramsey as an economist', *Economic Journal*, vol. 40, March, 153-4 ; JMK 10, 335-6.
1931-26. 'Logic', *New Statesman and Nation*, vol. 2, 3 October, 407; 'Ramsey as an

philosopher', JMK 10, 336-9.

1936-1. *The General Theory of Employment, Interest and Money*, London, Macmillan; JMK 7.

1937-4. 'The general theory of employment', *Quarterly Journal of Economics*, vol. 51, February, 209-23 ; JMK 14, 109-23.

1938-12. 'My early beliefs', paper read on 11 September to the Bloomsbury Memoir Club, first published in 1949-1 ; JMK 10, 433-50.

1939-9. 'Professor Tinbergen's Method', *Economic Journal*, vol. 49, September, 558-68 ; JMK 14, 306-20.

1939-14. 'The income and fiscal potential of Great Britain', *Economic Journal*, vol. 49, December, 626-35 ; JMK 22, 52-66.

1940-3. 'Comment [on Tinbergens' reply to J.M.K.'s review of "Professor Tinbergen's method"]', *Economic Journal*, vol. 50, March, 154-6; JMK 14, 318-20.

1944-1. Post-war employment, Note by Lord Keynes on the Report of the Steering Committe, 14 February; JMK 27, 364-72.

1947. 'Newton, the man', in *Newton Tercentenary Celebrations, July 15-19, 1946*, Cambridge, Royal Society of London, 27-34 paper read to the Royal Society , London, 30 November 1942 ; JMK 10, 363-7].

Other references

Bateman, Bradley W. (1987). 'Keynes's changing conception of probability', *Economics and Philosophy*, 3, 97-120.

_____ (1996), *Keynes's Uncertain Revolution*, Ann Arbor : University of Michigan Press.

Bell, Clive (1956), *Old Friends: Personal Recollections*, London : Chatto & Windus.

Broad, C. D. (1922), '*A Treatise on Probability*. By J. M. Keynes', *Quarterly Review*, 31, 72-85.

Carabelli, Anna (1988). *On Keynes's Method*, London, Macmillan.

Coates, John (1996). *The Claims of Common Sense: Moore, Wittgenstein, Keynes and the Social Sciences*, New York : Cambridge University Press.

Davis, John B. (1991). 'Keynes's critiques of Moore: philosophical foundations of Keynes's economics', *Cambridge Journal of Economics*, 15, 61-77.

_____ (1994). *Keynes's Philosophical Development*, Cambridge : Cambridge University Press.

_____ (ed.) (1995). *The State of Interpretation of Keynes*, Dordrecht : Kluwer Academic.

Favereau, Olivier (1985). 'L'incertain dans la "révolution keynésienne": l'hypothèse Wittgenstein', *Économies et sociétés, Oeconomia*, vol. 19, 29-72.

Fitzgibbons, Athol (1988), *Keynes's Vision: A New Political Economy*, Oxford : Clarendon Press.

Friedman, Milton (1953). 'The methodology of positive economics', in *Essays in Positive Economics*, Chicago : University of Chicago Press, 3-43.

Haavelmo, Trygve (1943). « Statistical testing of business-cycle theories », *Review of Economic Statistics*, vol. 25, 13-18.

Hamouda, Omar and Rowley, Robin (1996), *Probability and Economics*, London : Routledge.

Koopmans, Tjalling C. (1941). 'The logic of econometric business-cycle research', *Journal of Political Economy*, 49, 157-81.

Lavialle, Christophe (2001). 'L'Épistémologie de Keynes et "l'hypothèse Wittgenstein: la cohérence de la *Théorie générale de l'emploi, de l'intérêt et de la monnaie* », *Cahiers d'économie politique*, no. 38, 25-64.

Lavoie, Marc (1985). 'La distinction entre l'incertitude keynésienne et le risque néoclassique', *Économie appliquée*, vol. 38, 493-518.

Marion, Mathieu (2005). 'Sraffa and Wittgenstein : Physicalism and Constructivism', *Review of Political Economy*, vol. 17, no. 3, 37-62.

Monk, Ray (1990), *Ludwig Wittgenstein: the Duty of Genius*, New York : Free Press.

Moore, George E. (1903). *Principia Ethica*, revised edition, Cambridge : Cambridge University Press, 1993.

Nadeau, Robert (1999). *Vocabulaire technique et analytique de l'épistémologie*, Paris : Presses Universitaires de France.

Newman, Peter (1987). 'Ramsey, Frank Plumpton', in Eatwell, John, Milgate, Murray and Newman, Peter (ed.), *The New Palgrave Dictionary of Economics*, London : Macmillan, vol. 41-6.

O'Donnell, Rod M. (1989). *Keynes: Philosophy, Economics and Politics: The Philosophical Foundations of Keynes's Thought and their Influence on his Economics and Politics*, London : Macmillan.

Pigou, Arthur C. (1921). '*A Treatise on Probability*' By J. M. Keynes », *Economic Journal*, vol. 31, 507-12.

Porter, Theodore M. (1986), *The Rise of Statistical Thinking, 1820-1900*, Princeton : Princeton University Press.

Porter, Theodore M. (1995), *Trust in Number : The Pursuit of Objectivity in Science and Publicity*, Princeton : Princeton University Press.

Ramsey, Frank (1921). 'Mr. Keynes on probability', *Cambridge Magazine*, 1 (1), 3-5.

_____ (1926). 'Truth and probability', in *The Foundations of Mathematics and Other Logical Essays*, London : Routledge & Kegan Paul, 1931, 156-98.

Robinson, Austin (1964). 'Could there have been a "General theory' without Keynes", in Lekachman, Robert, éd., *Keynes' General Theory: Reports of Three Decades*, London : Macmillan, 87-95.

Russell, Bertrand (1912). *The Problems of Philosophy*, London : Thornton Butterworth ; New York : Oxford University Press, 1959.

_____ (1922). ' *A Treatise on Probability*. By John Maynard Keynes', *Mathematical Gazette*, 11, 119-25.

_____ (1967). *The Autobiography of Bertrand Russell: 1872-1914*, London : George Allen and Unwin.

Skidelsky, Robert (1983). *John Maynard Keynes*, vol. 1, *Hopes Betrayed: 1883-1920*, London : Macmillan ; American edition, New York, Viking, 1986.

Stone, Richard (1978). 'Keynes, political arithmetic and econometrics', *Proceedings of the British Academy*, vol. 64, 55-92.

Tinbergen, Jan (1935). 'Annual survey: Suggestion on quantitative business cycle theory', *Econometrica*, 3, 241-308.

_____ (1939). *Statistical Testing of Business-Cycle Theories*, Genevea, League of Nations, 2 vol.

_____ (1940). 'On a method of statistical business cycle research: a reply', *Economic Journal*, 50, 141-54.

Walley, Peter (1991), *Statistical Reasoning with Imprecise Probabilities*, London : Chapman and Hall.

Wittgenstein, Ludwig (1974). *Letters to Russell, Keynes and Moore*, edited by G. H. von Wright, Ithaca, New York, Cornell University Press.

Woolf, Virginia (1975-1980). *The Letters of Virginia Woolf,* London : Hogarth Press, 6 vols.

KEYNES AND HIS BATTLES

Gilles Dostaler

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