

## **John Maynard KEYNES**

b. 5 June 1883 - d. 21 April 1946

**Summary.** Keynes was a philosopher-economist whose abiding interest in logical argument, probability and statistics, and his fertility and originality in economic theory and policy, made him one of the most influential figures of the 20th century.

Born in Cambridge, England, to a middle class family, Keynes was educated at Eton and King's College, Cambridge. He later achieved greatest fame as an economist, but he never took an economics degree. Although his undergraduate studies were in mathematics, his intellectual passion at that time was philosophy, the primary influence here being G.E. Moore, the noted ethical philosopher. Grappling with Moore's arguments about morality, in fact, led Keynes to formulate the germ of his ideas on probability in 1904. It was only after completing his mathematics degree that he began the concentrated study of economics, his main mentor being Alfred Marshall. During his first period of employment in the British Civil Service at the India Office where he worked on economics and statistics, he submitted a fellowship dissertation on 'The Principles of Probability'. A revised version in 1908 won him a fellowship at King's College in 1909. Eventually published in 1921 as a *Treatise on Probability*, it had a significant impact on the philosophy of probability at the time, but its influence has since waned considerably. Nevertheless it remains central to understanding his thinking on logic, probability, rationality, and statistical inference. In 1908, while re-working his dissertation, he even envisaged his future field of academic expertise to be Logic and Statistical Theory. Marshall had other ideas, however, and offered an Economics lectureship which Keynes accepted because it provided a means of returning to Cambridge from London. During World War I, he worked in the British Treasury and was a delegate to the Versailles Conference in 1919. Finding the reparations conditions imposed on Germany economically and morally outrageous, he resigned and wrote *The Economic Consequences of the Peace*, the first book that made him world-famous.

For the rest of his life Keynes was mainly engaged with economics, though other interests also absorbed his attention such as politics and the arts. In economics, where his output was enormous and influential, he focused on theoretical and practical issues as well as individual countries and the world economy. Inflation and exchange rate instability were early concerns in the

1920s, followed by unemployment during the 1930s Great Depression, and inflation again during the 1940s war years. His magnum opus in economics was *The General Theory of Employment, Interest and Money* of 1936, a pioneering work that established modern macroeconomics, created Keynesian economics as a serious alternative to Neoclassical economics, and stimulated the development of National Accounting statistics. During World War II, he again assisted the British war effort in the Treasury. In his final years, he played a key role in the negotiations that shaped the institutions which dominated the post-war international economy - the Bretton Woods system, the IMF, and the International Bank for Reconstruction and Development. In 1925 he married the Russian ballerina, Lydia Lopokova, but there were no children. He died of a heart attack in 1946, brought on by over-work.

It was as a young man that Keynes did the bulk of his work on probability and statistics. The years 1908-12 saw nine contributions to the *Journal of the Royal Statistical Society (JRSS)* and several on statistical subjects to the *Economic Journal (EJ)*. These were concerned with index numbers, a critique of Elderton and Pearson (q.v.) (see below), reviews of seven European works on probability and statistics (by Borel (q.v.), Czuber, Poincaré, Bachelier (q.v.), Carvello, Markov (q.v.) and Horrowicz), and the theory of averages where Keynes argued that popular preference for the arithmetic mean was misplaced since it did not always provide the most probable value. In 1909 he wrote a long, prize-winning essay on Index Numbers.

In the philosophy of probability, Keynes is best known as a founder of the logical theory of probability, a rival to the relative frequency and subjective theories. His ideas are set out in his philosophical magnum opus, the *Treatise on Probability*. This is not a mathematical work on the probability calculus, but a philosophical work concerned with logic and rationality. Keynes argued that probability is *the general logic of rational but non-conclusive argument*, within which deductive logic is the special case of complete certainty or unit probabilities. This view conceives of probability as a logical relation between a conclusion,  $a$ , and premisses or data,  $h$ , which give partial support to  $a$ . Keynes's symbol for probability is  $a/h$ , which emphasises the data-dependence of probabilities. Probabilities express degrees of partial inference (the degree to which  $a$  may be inferred from  $h$ ), and degrees of rational belief (the degree to which it is rational to believe  $a$ , given  $h$ ). Such probabilities may be numerical (the smaller class) or non-numerical (the larger class), and may be known or unknown. The means by which we obtain knowledge of probabilities is logical insight or intuition into the

realm of (objective) logical relations between pairs of propositions. On these foundations, Keynes derived the probability calculus, developed a theory of induction, explored objective chance and randomness, and outlined a theory of rational conduct. He also investigated statistical inference, his object being to analyse ‘the logical basis of statistical modes of argument’, and to engage in the *dual task* of discrediting invalid inferences and analysing valid ones. He traversed the law of large numbers, the theorems of Bernoulli (q.v.), Poisson (q.v.) and Chebychev (q.v.), Laplace’s (q.v.) rule of succession and the methods of Lexis (q.v.), and sketched the outline of a constructive theory. The following passages illustrate his dual task and his preference for logic over algebra:

Such is the famous theorem of Bernoulli which some have believed to have a universal validity and to be applicable to *all* ‘properly calculated’ probabilities. Yet the theorem exhibits algebraical rather than logical insight. And ... it is only true of a special class of cases and requires conditions, before it can be legitimately applied, of which the fulfilment is rather the exception than the rule.

I conclude ... that the application of the mathematical methods, discussed in the preceding chapter [the inversion of Bernoulli’s theorem and Laplace’s rule of succession], to the general problem of statistical inference is invalid. ... To apply these methods to material, unanalysed in respect of the circumstances of its origin, and without reference to our general body of knowledge, merely on the basis of arithmetic and of those of the characteristics of our material with which the methods of descriptive statistics are competent to deal, can only lead to error and to delusion. But I go further than this in my opposition to them. Not only are they the children of loose thinking, and the parents of charlatantry. Even when they are employed by wise and competent hands, I doubt whether they represent the most fruitful form in which to apply technical and mathematical methods to statistical problems, except in a limited class of special cases. The methods associated with the names of Lexis, Von Bortkiewicz, and Tschuprow ... seem to me to be much more clearly consonant with the principles of sound induction.

Studying the history of thought, to Keynes, was a ‘necessary preliminary

to the emancipation of the mind'. He was extremely well read in the history of probability and statistics, and made his own contributions through biographical essays. In 1936, he delivered an invited paper to the Royal Statistical Society celebrating the centenary of the birth of W.S. Jevons (q.v.). Published in the *JRSS*, the paper explored Jevons's contributions to economics and statistics, noting his 'fertility and originality of mind' in relation to index numbers and the importance of his inductive studies. Other thinkers were commemorated through obituaries, mainly in the *EJ- W. Lexis* (1914), who developed new statistical concepts of 'the utmost importance'; F.Y. Edgeworth (q.v.) (1926), who ranged over economics, psychology, probability, statistics and index numbers; A. Chuprov (q.v.) (1926), 'one of the most important writers' on the boundary between statistical theory and probability; C.P. Sanger (1930), 'at one time a leading authority on mathematical and statistical economics'; F.P. Ramsey (1930), a critic of Keynes in probability, a founder of the modern subjective theory and 'one of the brightest minds of our generation'; and G. Broomhall (1938), who was 'perhaps the greatest practical statistician of our age'.

All his life Keynes strongly advocated the collection and analysis of statistical information by government agencies. Such information was crucial to rational decision making in both the public and private sectors. Government had a 'natural duty' in this area, where its activities were to be guided by the general principles of completeness, openness and timeliness. 'There ought', he stated in 1943, 'to be very little indeed within the knowledge of Government departments which should not also be made more widely available'. In the absence of such official statistics, he was instrumental, with A.L. Bowley (q.v.), W. Beveridge and others, in establishing the London and Cambridge Economic Service in 1923, the purpose of which was to publish monthly bulletins of economic statistics to inform business about current facts and trends, and to provide them with various indices, charts and memoranda. In the 1930s he supported the establishment of the National Institute for Economic and Social Research, an independent research organisation with a strong interest in statistical information, and served on its Council. Charles Madge and Mass Observation received his encouragement in the 1940s, Keynes praising one of Madge's projects as 'an enquiry of first class importance'. Also receiving his firm backing in the 1930s and 40s was the founding and development of the Department of Applied Economics at Cambridge University.

Keynes was involved in two statistical controversies in his life-time. The

first, in 1910-11, concerned a study by Ethel Elderton and Karl Pearson of the influence of parental alcoholism on children; this concluded that parental drinking had no harmful effects on offspring. Keynes attacked the study on methodological grounds in the *JRSS*: 'It is a question, not of facts, but of the nature of valid argument which is in dispute'. In his view, the study was 'misleading', 'almost valueless', and an example of the application of 'a needlessly complex mathematical apparatus' to data which were 'unsuited to the problem in hand'. The controversy, which embraced the press, other Cambridge economists and the medical profession, had a significant impact on Keynes, for it motivated him to expand his initially modest discussion of statistics in his dissertations into a section on 'The Foundations of Statistical Inference' in the *Treatise on Probability*.

The second controversy occurred in 1938-40 when Keynes wrote a critical review of Jan Tinbergen's statistical study of the determinants of investment which had been commissioned by the League of Nations. His wide-ranging critique again centred on methodology - the logic of applying multiple correlation analysis to material which varied over time, and the difficulties of drawing inductive conclusions. The strength of Keynes's remarks, including the use of terms such as 'statistical alchemy', 'black magic' and 'charlatanism', led many to the view that he was hostile to the whole econometrics enterprise, but this view is mistaken. As he made quite clear in two final letters to Pigou and Lange, he was *not* disputing 'the validity of any conceivable statistical method' but only 'Tinbergen's very special method of analysis'.

Keynes also made notable contributions to professional societies. Apart from his unparalleled service to the Royal Economic Society and the *EJ*, he was a long-term member of the Royal Statistical Society, and served on its Council for three periods (1915-19, 1933-37, 1941-45). In the Econometric Society, he played an equally constructive role. One of its founding fellows, he served on its Council from 1934 to 1946 and was elected president in 1944 and 1945. In 1945, he supported Tinbergen as a candidate for Vice-President, there being no-one 'for whose work one could be more anxious to give every possible scope and opportunity'.

Keynes's deep interest in statistics grew out of his twin loves of philosophy and economics. He held statistical information in high regard as a necessary input of rational thought and policy-making, and he also supported statistical inference, albeit more circumspectly. His prime concern here, as with formalism generally, was methodological - the appropriateness of the application of statistical techniques to the material under investigation. This made him

a severe and hostile critic of *inappropriate* applications of formal methods, whether in mathematics, statistics or econometrics, and it was his attacks on such ‘pseudo-science’ which gave rise to the superficial and mistaken view that he was generally antipathetic to the use of formal methods in the social sciences. The dominant characteristic of Keynes’s approach to statistics, as with formal methods generally, was an insistence on philosophical and logical integrity in their application. It was always his view that logical and conceptual reasoning took precedence over mathematical virtuosity and technical sophistication. His motto, if he had had one in this area, would have been something like *ratio ante computationem* (reason before calculation).

## References

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