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Economic theory after Keynes: a new methodological approach

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Introduction

In his introduction to the Series of *Cambridge Economic Handbooks*, 1922-3, Keynes writes: 'The theory of economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, which helps its possessor to draw correct conclusions' (CWXII: 856). The passage throws light on the continuity between *A Treatise on Probability* and Keynes's economic works. In his discussion with Roy Harrod in 1938, that is, in his most mature and outspoken methodological manifesto, when he declares that 'economics is a branch of logic, a way of thinking', rather than a pseudo-natural science', Keynes only restates his early position (CWXIV: 296).

Keynes view of economic theory is thus of a method or logic, perhaps best described as an apparatus of probable reasoning. In chapter 21 of *The General Theory*, he writes that the object of economic analysis is, 'not to provide a machine, or method of blind manipulation, which will furnish an infallible answer, but to provide ourselves with an organised and orderly method of thinking out particular problems'. But, he adds, 'after we have reached a provisional conclusion by isolating the complicated factors one by one, we then have to go back on ourselves and allow, as well as we can, for the probable interactions of the factors among themselves'. He points out that 'this is the nature of economic thinking' and that we would be lost in the wood without abstract and logical reasoning: 'Any other way of applying our formal principles of thought (without which, however, we shall be lost in the wood) will lead us into error' (CWVII: 297）.

Keynes maintains that economics is not a natural science and that positivistic methods could not be applied to it. His discussion on the limits of the application of the atomic hypothesis within physical science itself appears in his early writings on probability, in addition to his non-positivist interpretation of Newton's method (TP 276-7 on the atomic and organic hypotheses; Carabelli 1988: 100-102, 109). Further, a very early reference to the 'mechanical theory' of physical science, with its distinction between primary and secondary qualities, can be found in his 1905 *Miscellanea Ethica*: 'It is often supposed that in shape, size and motion the objects are like the sensations, and that in colour, taste, smell, heat and cold they are unlike. This is the mechanical theory of the external world' (Keynes MSS Miscellanea Ethica, 19.9.1905).[1]

What, then, is economics for Keynes? The answer is that he regards economics as both a moral science and a branch of logic. It is a moral science insofar as it deals with ethical values and introspection (CWXIV: 300). And it is at the same time a branch of logic, a way of thinking. It is fundamentally a method, which helps economists to draw conclusions, which are 'logically' correct,

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[1] All the excerpts from Keynes' manuscripts quoted here are taken from Carabelli's previous writings. I renew my gratitude to Keynes Trustees and King's College for permission to quote from Keynes' MSS.

i.e. to avoid falling into logical fallacies in reasoning, like the additive fallacy of probability or the fallacy of composition in economics.

The key point, according to Keynes, is that without this logic, economists may lose themselves in the empirical and mathematical wood, as, in his view, both econometricians like Tinbergen and Colin Clark, and mathematical economists had done. The problem, as he saw it, is that the application of mathematical and statistical languages - with their presuppositions of homogeneity, atomism and independence – to economic material that is essentially 'vague', 'indeterminate', gives rise to logical fallacies: one of them being the fallacy of 'ignoratio elenchi' in the classical economic theory (Carabelli 1991). Keynes's definition of mathematics as 'imprecise' in *The General Theory* means that the blind application of mathematics and statistics to economics, with its non-numerical, non-comparative and non-ordinal aspects, requires logical attention (CWVII: 298; Carabelli 1995).

In the paper I argue that the true novelty in Keynes's theory is his method, which represents a new way of reasoning in economics. It is a non demonstrative logic, based upon probability. Keynes's *A Treatise on Probability* is his "essay on method". Continuity exists between his *A Treatise on Probability*'s method and that of his economic writings, as well as continuity exists between this method and that of his ethics and aesthetics, as well as of his approach to international relations. I stress here the relevance of *A Treatise on Probability*'s probability as a *general* methodological approach.

I advance here an interpretation also based on coherence. In addition to the stress on Keynes's methodological continuity, I argue that Keynes's method is coherent in the various aspects of his reasoning (rationality, measurement and comparison of complex magnitudes, moral and rational dilemmas and irreducible conflicts, multilateralism). It is in particular related to complexity, incommensurability and openness. Keynes deals, consistently and continuously, with multiform, heterogeneous and organically interdependent magnitudes. These magnitudes are probability, goodness, beauty, utility, the general price level, real capital and aggregate income or output.

Complex and incommensurable magnitudes:
- TP's probability 1904, 1907-8, 1921
- goodness 1905, 1907-9, 1921
- beauty 1905
- utility 1905, 1909
- the general price level (Essay on Index Numbers 1909; Tract on Monetary Reform 1923; Treatise on Money 1930),
- real aggregate capital (GT 1936)
- aggregate income or output as whole (GT, chp. 4).

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1. Rationality as reasonableness: probability.

In *A Treatise on Probability*, Keynes conceives probability as a logical relation between propositions (arguments) - i.e. between premises and conclusions. The material of probability consists of propositions: reasons, grounds or evidence supporting the relation of probability are propositions. The relation of probability is a quantity. It is, in general, a non-numerically measurable quantity; Keynes points out that a quantity is not necessarily a number. Lastly, probability is an *intrinsically indeterminate* quantity (Keynes PP 65; TP 32-5).

For Keynes there exists the possibility to form an individual reasonable judgement which grounds expectations and action in conditions of limited knowledge. Having 'some reason' (ground or evidence) 'for expecting' and acting is a sufficient condition to form a reasonable judgement and a reasonable action (TP 277). Keynes' expectations are based on logical probability. Logical probability is the true guide of life. It is relative to real limited knowledge, that is it depends on 'some good reason', ground or evidence.[2] In his 1904 essay "Ethics in Relation to Conduct", which represents the starting point in his discussion of logical probability, Keynes writes that 'probability implies ignorance; it is because we do not know for certain that we use the word at all' (MSS 1904, unnumbered page). In 1921, in his *A Treatise on Probability,* Keynes re-stresses that probability is the hypothesis upon which it is reasonable for us to act in condition of limited knowledge (TP, CW VIII, 339). For him, the general principles which rule human conduct are also those which rule probable reasoning. These principles are logic as they belong to non-demonstrative logic, but - and this one of the central points of *A Treatise on Probability* - they also depend on direct judgements of indifference and relevance and, in the end, on intuition.

Probability depends on the limited knowledge available (known partial reason, ground or evidence) and is therefore relative to and varies if circumstances vary; the selection of evidence, the process of abstraction by which the individual extracts reason, ground and evidence he judges relevant from the total knowledge available to him, is subjective. But probability, given reason, ground or evidence, is logical and objective. For Keynes, the a priori logical probabilities are neither subjective judgements à la Hume, that is "lively imaginations", ungrounded and irrational, nor mere empirical frequencies à la Venn.

Keynes maintains that what matters is the reasonableness, neither the absolute rationality nor the truth, of judgement and action. Furthermore, reasonableness does not depend on the success or fulfilment of expectations. If, by mere luck, a foolish judgement turns out successful or fulfilled,

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[2] Probability measures the balance between the favourable and unfavourable partial knowledge available; while the weight of argument measures the absolute amount of it. The weight, in particular, measures the confidence in probable expectations.

this does not make it more reasonable.[3] Reasonableness is relative to contingent and changeable cognitive circumstances. If they change, probability and reasonableness will change too. Keynes's notion of reasonableness is a sort of contingent rationality, comparable to 'phronesis', Aristotle's practical reason in *Nichomachean Ethics* (Carabelli 1988: 150). For Aristotle, "phronesis", i.e. prudence or wisdom in concrete situations, characterises those decisions, such as political action and judge' deliberation where it is not possible to deduce from general and immutable principles, as is possible in mathematical demonstrations where both truth and calculus govern. In politics or in the courts of justice, we have to take a decision without knowing the truth, thus deliberating on the basis of probability and likeness. Not for this, however, does the arbitrariness of political decisions or the judges' deliberation imply irrationality.

Individual economic expectations, reasonableness and conventional rules[4]

Keynes's conception of logical probability is reflected in his view on individuals' economic expectations and actions in changing circumstances. At the root of his economic theory is the rejection of the assumption of complete knowledge and the need for a theory of partial knowledge. Keynes distinguishes between reasonable and conventional expectations.

While reasonable expectations are grounded on logical probabilities, i.e. upon *real*, albeit limited, knowledge, conventional expectations are practical responses to the existence of total ignorance and uncertainty. While logical probabilities are grounded upon *real* knowledge, i.e. upon some known reason, ground, evidence in which we *really* believe, conventional expectations are not 'genuine' guides of action, but only artificial and practical means by which we rationalise ignorance and uncertainty: so we do not really believe in conventions. Conventional expectation are based upon tradition, habits and practices, rules and routines as manifested in patterns of behaviour based on mere experience. Common knowledge (grounded upon the opinion of the majority of the market or upon the way represented by the well-known beauty contest) and imitation of those we think know better than us, belong to conventional expectations (Carabelli and De Vecchi 1999a; 1999b; Carabelli and Lanteri 2008).

For Keynes, individuals have the capacity to form 'reasonable' ('genuine', 'real', 'sound', 'wise' as he also calls them) judgements concerning the future. To form expectations and act

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3 The following passage by Herodotus, which Keynes quotes in TP, helps to clarify the point: 'There is nothing more profitable for a man,' he says, 'than to take good counsel with himself; for even if the event turns out contrary to one's hope, still one's decision was right, even though fortune has made it of no effect: whereas if a man acts contrary to good counsel, although by luck he gets what he had no right to expect, his decision was not any the less foolish' (TP: 339).

4 This and the following sections are taken with some changes from Carabelli, A. and De Vecchi, N. (1999); Carabelli, A. and De Vecchi, N. (2001a; 2001b; 2004) and Carabelli 2003.

reasonably, they *should* follow their own probable judgement based on the known information available to them, rather than falling back on conventions. Keynes attributes a positive role to actual limited, yet positive, knowledge regarding the immediate future and ignores the paralysing effect of the ignorance of the remote future. If we have some known reason regarding the present and immediate situation and 'no reason is known about the remote consequence', this would be a sufficient condition to form a reasonable judgement. In his 1904 essay 'Ethics in Relation to Conduct', Keynes argues against Moore's defeatist theory of action: 'There is no necessity first of all to convert this possibility into an impossibility' (MSS 1904, unnumbered page). Keynes shows all his life an anti-sceptical attitude which is in contrast with the Humean tradition, to which Hayek, for example, belongs (see Carabelli and De Vecchi 1999 and 2001).[5] His attitude is therefore in contrast with both behaviourism and cognitive evolutionary psychology. Keynes belongs to Aristotlelian practical reason and (justified) common sense tradition.

Speculator's knowledge

Keynes held that, in Stock Exchange markets, non professional agents are habitually guided by conventional expectations, because they lack knowledge. On the contrary, professional agents (speculators and long-term investor) have knowledge and skills superior to those of the average market and would be able to form a reasonable (probable) judgement, but they *actually do not*. In markets organised à la Stock Exchange, they use their ability to form reasonable judgement to anticipate market conventions: 'It is not a case of choosing those which, to the best of one's judgement, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest' (GT: 156) or 'thus certain classes of investment... by the average expectation of those who deal on the Stock Exchange as revealed in the prices of shares, rather than by the genuine expectations of the professional entrepreneur' (GT: 151). Professional agents try to anticipate conventions, precisely because they have specific real limited knowledge superior to that of the market. They know that market follows conventional behaviour. On this aspect, it is interesting to see what Keynes writes in his 1910 manuscript notes for the preparation of his lectures on the stock exchange, when he examines the nature of speculation (MSS, UA/6/3, Notebook, 8 Lectures on Company Finance and Stock Exchange, Lent Term 1910): 'the essential characteristic of speculation is, it seems to me, the possession of superior knowledge'; 'the speculator's knowledge or judgement is superior to that of the market' (Keynes MSS 1910, UA/6/3: 93). What distinguishes

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5 Keynes interpreted Hume as a sceptic thinker, a defender of habits and mere experience against any form of reason. At the light of modern interpretations of Hume's thought, Keynes's interpretation of Hume seems to be not quite correct.

a speculator from a gambler is knowledge: 'I shall regard the possession of superior knowledge as the vital distinction between the speculator and the gambler' (ibidem p. 98). A gambler has no knowledge.[6] In my 2002 article on 'Speculation and Reasonableness: a non-Bayesian Theory of Rationality' (Carabelli 2002), I argue that Keynes' speculation and liquidity preference theory are based upon reasonable expectations. In 1910, Keynes qualifies speculation by means of adjective 'sound', i.e. reasonable. This does not imply that speculation ought to be coherent in a Bayesian sense, nor empirically successful in a lucrative sense (see footnote 3 above). Gamblers, for instance, may become wealthy, yet this does not qualify them as reasonable. Speculator only differs from investor (or entrepreneur) in terms of his time horizon, not in terms of knowledge: both are agents who try to reasonably forecast the future from presently available information, but the investor (entrepreneur) forecasts the long term yields of an investment, whereas the speculator "buys and sells again soon" "within a relatively short period" (Keynes MSS 1910, p.100)

Ignorance and uncertainty

In some situations it is *actually impossible* to form reasonable judgements as no information is available, not even regarding the present and the immediate future. This situation represents a condition of total ignorance: there is no known reason, ground or evidence.[7] So there is no probability or, if it does exist, it is unknown. To this situation of total ignorance, Keynes adds another relevant situation: uncertainty, when probability exists but cannot be reduced to calculable risk.[8] As we will see in section 2. this situation is connected with *intrinsic incommensurability*, or indeterminateness, of probability and is relevant to my interpretation of Keynes' method.

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6 In his 1910 Notes Keynes points out: 'the essential characteristic of speculation is, it seems to me, the possession of superior knowledge. We do not mean by the risk of an investment its actual future yield - we mean the degree of probability of the yield we expect. The probability depends upon the degree of knowledge. In a sense, therefore it is subjective. What would be gambling for one man would be sound speculation for another (instance from betting). (Keynes MSS 1910, UA/6/3: 93)

7 In GT, Keynes writes: 'the element of real knowledge in the valuation of investments by those who own them or contemplate purchasing them has seriously declined' (GT: 153) and 'Investment based on genuine long-term expectation is so difficult today as to be scarcely practicable' (GT: 157)

8 In his 1910 manuscript notes for the preparation of his lectures on the stock exchange (MSS, UA/6/3, Notebook, 8 Lectures on Company Finance and Stock Exchange, Lent Term 1910), Keynes, while examining the nature of speculation., distinguishes four main situations on the basis of the nature and calculability of risk (Keynes MSS; UA/6/3). He speaks of risk as calculable or incalculable but he never uses the term 'uncertainty', even though this term is present in various passages of the authors he considers (for example, in H.C. Emery's 1896 book, *Speculation on the stock and produce exchange of the United States*, New York, Columbia University). The four situations are:
    1. situations where risk is not calculable. The example given by Keynes is insurance against political events at an insurance company ('some political insurances at Lloyd's');
    2. situations where risk is more or less calculable. These situations are further distinguished into two sub cases. In the first sub case (2a), risk is 'not averaged'. The example is that of the roulette at Monte Carlo. In the second sub case (2b), risk is instead 'averaged'. The example is life or fire insurance;

Another relevant situation of uncertainty dealt by Keynes, which I will not deal with here, is that of very low 'weight of argument' in probable judgements. Probability measures the balance between the favourable and unfavourable partial knowledge available; while the 'weight of argument' measures the absolute amount of it. The weight, in particular, measures the 'confidence' in probable expectations. A situation of low weight is when the amount of knowledge available is very low. These three situations could be resumed by the following scheme:

- *IGNORANCE* there are no reasons, not even some partial reason. In this case, there is no probability and no reasonableness. This situation is of total ignorance; if a probability exists, it is unknown due to want of reasoning power or cognitive skill;

- *LOW WEIGHT* there is very low weight of argument. The total amount of available knowledge is very limited; so there is very low weight in probable belief (low 'intensity of belief'), very low 'confidence' in reasonable belief. Reasonable beliefs are not firm but unstable and prone to high volatility; they easily changes if a new piece of relevant information or knowledge becomes available;
- *INTRINSIC INCOMMENSURABILITY* probabilities exist but they are non comparable and incommensurable

In the case of total ignorance of the future and uncertainty, no one is able to escape traditional rules and conventions, not even professional short-term speculators and long term professional investors. In these cases - but only in these cases of total ignorance and uncertainty - Keynes suggests following conventional rules. If no knowledge is available on which to ground reasonable judgments or in uncertainty situations, the best would be to refrain from acting and to postpone decision. If one is compelled to act, the second best thing to do is to follow conventions. Then it is reasonable to follow practical hypotheses to face uncertain future. For example, we have no known reason or evidence for the changes of the rate of interest twenty years ahead. In this case, conventional expectations come into play. In this case, even for Keynes, to follow practical rules, and even 'caprice, 'whim', 'optimism', is reasonable.

In the market, imitative and camouflage behaviour is similar to that of the spider which, in order to survive, tends to copy nature. For Keynes too, imitation is a practical and reasonable rule for action, but only in situations of total ignorance, in that the ignorant individual tends to copy the behaviour of those he judges competent, technicians and professionals although they may not

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3. speculation.
Situations (1) and (2a) are considered by Keynes as situations comparable to 'gambling', in (1) the risk is not calculable; in (2a) it is calculable but not averaged. (2b) is a situation explained by insurance (averaged). Situation (3) is described only negatively, as not identical to 'taking risk'. It is also a situation different from (1) and (2a): that is, different from 'gambling'. As seen above, the distinction between speculation and gambling is fundamental to Keynes's analysis of financial markets and is a constant and recurrent theme in his thought.

actually be so competent or well-informed. The ignorant individual behaves reasonably as we do when we rely on the judgement of an authority or an expert.

However, according to Keynes, one is to be aware that rules or practices are conventions; they are neither grounded upon reason nor upon nature, they are, and remain, at least for Keynes, *human* artifices and devices which could be changed. This is the first fundamental difference between Keynes and Hume's followers, like Hayek and other behaviourists and evolutionary psychology thinkers (Marshall and modern cognitive behaviourism, for example). It is therefore quite surprising that in recent decades Keynes's economic expectations have been systematically read, wrongly in my view, by using a Humean-Hayekian epistemology (see Carabelli and De Vecchi 1999, 2001a, 2001b; Hodgson 1988, 1999, Winslow 1986, 1989; Marchionatti 2002 on Marshall and Keynes). In fact, in Keynes - but not for Hume's followers - being conventions just mere artifices, one can play with them, influencing them so as to reduce the social damage caused by them as far as possible or, if nothing better can be done, by substituting them with other less socially harmful conventions. Given that conventions exist because of the presence of ignorance, uncertainty and incommensurability, Keynes suggests that the acquisition of specific real knowledge (different from common knowledge and conventions) should be stimulated by public institutions. An increase in real knowledge helps to form reasonable, 'genuine', 'real' individual judgements; in this way ignorance, uncertainty and instability decrease. Increasing real limited knowledge may help mere opinions to become more reasonable, 'firm' and less prone to variability and instability.

In Keynes's view, the existence of a short-term market such as the Stock Exchange does not aid in this process of strengthening knowledge; indeed it helps the formation of new artifices and conventions. Conventional and imitative behaviour is, negative for Keynes, as it provokes disorder, instability and injustice. In brief, for Keynes, conventions are at the origin of unemployment. The second fundamental distinction between Keynes and Hume's followers, Hayek in particular, as concerns conventional rules is thus the following: while for Hayek these rules are selective, successful and just knowledge, for Keynes they are mere artefact, not real knowledge and indeed unjust. Conventions do not guarantee the co-ordination of individual plans of action, nor stability, because conventions, being ungrounded, may change unexpectedly and abruptly in time. As a consequence, Hayek's 'system of abstract rules of conduct' cannot evolve without sudden and violent ruptures. For Keynes, conventions are extremely fragile, as they are just means by which we rationalise ignorance and uncertainty.

Keynes would object to Hayek that conventions are the 'idola' of the market and give rise to negative social consequences, like financial instability and unemployment. Thus, as a rule, in

contrast with Hayek's suggestion to 'follow rules', individuals and public institutions, in particular, should not follow them. The individual has to consider each case on its own merits and by a personal autonomous judgement, independent of traditional judgement, independent of the judgement of the majority or of the most common opinion. As seen, this can be done, by taking advantage of all the limited knowledge available. The importance attributed by Keynes to exceptions, in contrast with rules, is the third fundamental key to understand Keynes's contrast with Hume's followers on the theory of human action. Economic theory, according to him, should not follow these 'idola', in particular market idols. Consequently, market ought not to lay down the rules of right (and reasonable) action, but our own individual judgement based on the real, albeit partial, knowledge we have. Probability is the guide of life. Public institutions' aim is to contrast conventions in order to avoid the negative social consequences of the market.

1.3 Reasonable justification of economic policy

In his economic policy's view Keynes disagrees with the idea, held by Hayek for example, that knowledge held by public institutions is similar to that of individuals: institutions share with individuals a condition of ignorance, which impedes an autonomous reasonable judgement. This has an influence on the nature and role played by public institutions in economic life and on how collective agents are, or should be, guided in the formation of their decisions, on their capability to intervene and on the opportunity of such intervention to cope with any failures of the market system.

Keynes's public institutions are collective agents endowed with partial knowledge and reasonableness: what Hayek calls "fatal conceit" is, for Keynes, a positive aspect. As well as individual agents, social bodies have a "mind" or a "system or rules of decision". But, unlike the minds of individuals, the collective mind is necessarily an "artificial mind". Hayek thought the idea of a collective and artificial mind totally unacceptable. Keynes, on the contrary, maintained that the collective mind is an autonomous conceptual entity and that public institutions know more than individuals (Carabelli and De Vecchi 1999, 2001a and 2001b).

Keynes's view on the positive and active role of collective agents is linked with his defence of economic intervention; but is also linked with his view of the reasonable (probable) justification of economic intervention, that is his general view on limited knowledge. He stuck to 'rational constructivism': 'schemes conceived by the mind' should substitute 'undesigned outcome of instinct' (Keynes CW XVII, p. 453). In particular, limited knowledge is not a bar to policy by public institutions: his concept of logical probability helps here. Keynes recognised that individuals

acting alone are totally ignorant or dominated by uncertainty. But, he thought that when they form a group and act as a social unit, they could defeat the forces of ignorance and uncertainty:

> It is not true […] that self-interest generally is enlightened, more often individuals acting separately to promote their own ends are too ignorant or too weak to attain even these. Experience does not show that individuals, when they make up a social unit, are always less clear-sighted than when they act separately (Keynes CW IX, p. 288).

Public institutions have more partial knowledge at their disposal than individuals. They also control some macroeconomic variables, like central banks with interest rates and governments with budgets, and have the power to act. Moreover, ignorance and uncertainty have no paralysing effects on their decisions. The stress that Hume's followers, like Hayek, lay on total ignorance results in a tendency to non-intervention. In contrast, Keynes's reformist attitudes are rooted in his confidence in the power of partial knowledge and ideas and on a justification based on reasonableness and probability (rather than certainty).

The specific characteristics of Keynes's discretionary policy are the following. First, policy should be "wise", i.e. reasonable. The negative consequences of "traders" and "merchants' errors" could be limited by "a wise policy" on the part of authorities (Keynes CW XVII, p. 263). Keynes's notion of wisdom refers to practical human reasonableness and prudence, Aristotle's phronesis as seen, which pays attention to changing circumstances. Policy should also be based upon "correct principles". Two qualities are in fact required for the policy maker: "cleverness and goodness". Keynes thought cleverness more difficult to be found and also the most important attribute of the two. As policy should be based on reason and intellect, the main tasks of a policy maker are firstly to create a conviction in the need for policy and secondly to find the means to reach the promised goal: "insufficiency of cleverness, not of goodness, is the main trouble", he writes (Keynes, CW XXVII, 384). In addition to these requisites, Keynes stressed that the timing and the force of policy are important (Keynes, CW XVII, 264; see also Moggridge 1992, 359-60). In their policies, public institutions should also show non-conformist and non-conventional attitudes. They mould the future and cannot be loyal to the past.

Keynes considers ignorance and uncertainty to be one of the main causes of malfunction in the market. Ignorance about the future and uncertainty (due to the incommensurability of probability as we will see in section 2.), either makes it impossible for individuals to make reasonable judgements on the outcome of their actions, or it induces a lack of confidence in the individual's assessment of immediate consequences. As a result, individuals fall back on average opinions or take refuge in rules, routines and conventions (conventional expectations). This is the root cause of both the reluctance to invest, the consequent failure of the economy to exploit the full

potential of available resources, and the speculative behaviour of those who, by dint of above average knowledge and skills, are able to exploit such behaviour to their advantage, but with destabilising effects on the economy as a whole (see Carabelli 2002).

Consistent with this analysis, Keynes proposed a form of economic intervention which is neither an imposition on nor a substitution for the activities of the individual. Rightly, Keynes defined his market reforms as a "middle way" between socialism and liberalism (Keynes CW XXVII, 111, 369; Skidelsky 1992, 219-41),

In fact, Keynes points out that it is precisely in those cases in which the individual is forced to adhere to average opinion, traditional rules or take refuge in conventions that public institutions are best placed to decide what action to take. Not only can they control a number of economic variables which individuals cannot, but they are also possessed of a greater store of knowledge than individuals. Public authorities can then use these assets to evaluate contingent circumstances at precisely the times when individuals are unable to do so. This is Keynes's reasonable justification for state intervention, based upon (limited) knowledge. He adds that public authorities, especially monetary, can intervene in situations which have become blocked by ignorance about the future or by uncertainty, and counteract conventions imposed by the market. In this case, public opinion can be modified and a new convention, less damaging to society, established.

It is, then, undeniable that Keynes has great faith in reason, but not in the sense that he gives it the power to predict the future. It is also important to underline that he is totally aware that it is necessary to satisfy a further condition, in order to ensure that public intervention has the desired effect. He repeatedly claims (Keynes CW XVII, 384, 387-8) that those in authority must be 'clever' and 'think and feel right'. In other words, to have the intellectual capacity to modify existing conventions, to experiment and persuade; to be at peace with their environment ("to be virtuous") above all because they share with the community a respect for the ultimate values of individual freedom: 'Dangerous acts can be done safely in a community which thinks and feels rightly, which would be the way to hell if they were executed by those who think and feel wrongly' (Keynes CW XVII, 387-8, 137-8, 259-61, 354, 444, 446).

1.4 Public institutions and limited knowledge

Discretionary policy is a "rational construction". Keynes suggests "constructive proposals" for it (Keynes CW XXVII, 138). Thus, policy needs a "qualified optimism" in addition to wisdom, reasonableness and ethical principles and non-conformist attitudes. In fact, policy should pay attention to immediate future rather than to remote future and long-term consequences. Keynes's constructivist attitude towards the future plays down remote future and uncertainty. In his view,

ignorance about the future and uncertainty should not paralyse policy. Public institutions should show will and courage, in particular the "power of will" towards the future:

> The future will be what we choose to make it. If we approach it with cringing and timidity, we shall get what we deserve. If we march on with confidence and vigour the facts will respond. It would be a monstrous thing to reserve all our courage and powers of will for War and then, crowned with victory, to approach the Peace as a bankrupt bunch of defeatists" (Keynes CW XXVII, 260).

As to courage, policy should proceed, freeing itself from any "psychology of fear" (ibidem, 209). Finally, the "public spirit" of authorities should be clear-sighted in policy (Keynes CW XVII, 450). This raises the problem of what is, for Keynes, their knowledge and how then the decision process is actually carried out by them and reasonably, à la TP, justified.

As Keynes never took perfect knowledge and certainty into consideration, the only situation worthy of consideration is where partial knowledge is available to public institutions. Keynes held that the decision process by public institutions is not substantially different from that of individuals, apart from the greater amount of partial knowledge which he attributed to them. This means that confidence (TP's weight of argument) in their probable judgement is higher and this, in general, means less uncertainty.[9] Besides, public institutions have the power to directly control economic variables, as in the case of central banks with interest rates and governments with budget (Keynes CW VII, p. 247). Keynes's logical probability and the "weight of argument" justify a reasonable policy based upon an autonomous probable judgement made by public institutions.

Problems arise when public institutions are in situation of total ignorance or uncertainty. Keynes was aware of the problems raised by ignorance which public institutions face in their decision processes and policies.[10] Thus, if the public institutions' possible ignorance is not different from that of individuals, how is their policy justified? The justification is, again, only probable. Keynes based his justification on the distinction between immediate future and remote future. In forming their probable judgement, which is the basis for a reasonable policy, public institutions must, first of all, distinguish between immediate and remote future. They should take into account the limited knowledge regarding the immediate future actually at their disposal, discarding the

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9 Probability measures the balance between the favourable and unfavourable partial knowledge available to public bodies; while the weight of argument measures the absolute amount of it. The weight, in particular, measures the confidence in their probable expectations, i.e. their uncertainty. Public bodies' probable judgement is a joint judgement of probability and weight (see section 2. on joint judgements).

10 In his proposal of regulating the value of gold, he noted that: "If, indeed, a providence watched over gold, or if Nature had provided us with a stable standard ready-made, I would not, in an attempt after some slight improvement, hand over the management to the possible weakness or ignorance of boards and governments. But this is not the situation, we have no ready-made standard" (Keynes CW IX, p. 178).

remote future and long-term consequences of policy. If this knowledge is available and 'nothing is known' about the 'remote future and long-term consequences', it is to be judged positively. Even if scarce, knowledge about the immediate future plays a positive role in forming a probable judgement and in grounding a probable policy. On the justification of public policy, Keynes argues in the same way as he does in 1904 against Moore's too strict requirement for having a measurable probability. Besides, for Keynes, public institutions are rarely in situations of total ignorance in the actual and concrete situations of life (see Keynes MSS 1904-6, 25 and CW VIII, 341-2).

2. Complexity and incommensurability: multidimensional, heterogeneous and interdependent magnitudes. Probability and economic magnitudes

The interest into the problems of the measurement and comparison of magnitudes is a constant throughout Keynes's intellectual career. In his 1938 'My Early Beliefs', Keynes remembers how in his youth for him and his Bloomsbury friends

> the problems of mensuration in which we had involved ourselves, were somewhat formidable. It was all under the influence of Moore's method, according to which you could hope to make essentially vague notions clear by using precise language about them and asking exact questions. It was a method of discovery by the instrument of impeccable grammar and an unambiguous dictionary (CW X: 440).

In 1938 he also notes 'though it is a comfort to-day to be able to discard with a good conscience the calculus and the mensuration and the duty to know exactly what one means and feels' (CW X:442). Moore's method was influenced by Scholasticism. What Keynes means by scholasticism can be derived from his 6th November 1933 lecture. Using a definition by Ramsey, Keynes explains that the essence of scholasticism "is treating what is vague as what is precise" (Rymes 1989:101).

My paper "Keynes on mensuration and comparison" shows how Keynes's analysis on the measurement and comparison of probability represents the thread between these two opposite positions on mensuration and calculation (Carabelli 1994)[11]. In particular, *A Treatise on Probability* (1921) and the earlier writings on probability (Keynes MSS 1904, 1907 PP) are the works in which Keynes's transformation comes about: passing from his early Moorean Scholastic position of 1903 to the mature one of 1938. In these works he criticises Moore's method (as well as Russell's) and elaborates his own original method (On Keynes and Moore, see also Davis 1991 and Shionoya 1991). In the early 1907 version of TP (titled *Principles of Probability*, henceforth PP) Keynes already stops dealing with the vague and imprecise concept of probability as if it was precise and calculable, thus abandoning Moore's Scholasticism and his Benthamite calculus ('discarding Moore's so highly problematical calculus', CW X: 445). In 1907 he already holds that justified common sense and ordinary language are the proper domain of probability.

2.1 Probability: measurement and comparison

To show Keynes's attitude to measurement and comparison of probability, I start from his manifesto in TP. Keynes has a three-fold conception of probability:

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11 The following sections are taken with slight changes from Carabelli 1994.

I maintain, then, in what follows, that there are some pairs of probabilities between the members of which no comparison of magnitude is possible; that we can say, nevertheless, of some pairs of relations of probability that one is greater and the other less, although it is not possible to measure the difference between them; and that in a very special type of case, to be dealt with later, a meaning can be given to a numerical comparison of magnitude (TP: 36)

Reversing Keynes's order, I call his first case, CASE-III; his second, CASE-II and his third, CASE-I. Hence:

CASE-I: numerical comparison of probabilities
CASE-II: quantitative comparison of probabilities in terms of equal, more or less (unequal)
CASE-III: non quantitative comparison of probabilities

CASE-I deals with numerically comparable probabilities, i.e. with cardinal (univocally numerical) probabilities. Most of the interpreters of Keynes's concept of probability agree substantially on the extremely limited role which this case plays in TP and in his economic writings. Bateman 1988 and 1989 is the relevant exception.

CASE-II deals with quantitatively, but non numerically, comparable probabilities in terms of equal, more or less (unequal). Comparison is quantitative when we can 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' (TP: 37). In this case, we can also speak of ordinal comparison between probabilities.

Quantitative comparison requires that each degrees of probability can be arranged in an order. Note however that the contrary is not always true. In examining CASE-III, we will see that, when different orders of probability exist, the ordering of probabilities does not guarantee, in general, the quantitative comparison between any two probabilities.

For the moment, let us limit ourselves to the existence of just one order of probability. A series of quantities ('degrees') of probability is ordered if between every pair of its members there is a relation of more or less (a relation of 'between'), so that we can affirm that a probability increases or decreases but not of how much (TP:31). A necessary condition for ordering probabilities is that the relation of 'between' holds between certainty, the quantities of probability under investigation and impossibility: 'in such a case a relation seems clearly to exist between the two [probabilities] in virtue of which one lies nearer to certainty than the other. Several types of argument can be instanced in which the existence of such a relation is equally apparent' (TP: 38). But Keynes points out: 'we cannot assume its presence in every case or in comparing in respect of more or less the probabilities of every pair of argument' (TP: 38).

The relation of 'between' is compared by Keynes to the relation of order of colours or to likeness between objects. A colour or an object supplies the standard of reference for ordering.

They are similar to certainty in the order of probability (TP: 38-9). Orders of probability are also compared by him to orders of the cardinal numbers (TP: 39) Keynes holds that orders of degrees of probability are not, in general, continuous. So, it is not true that every pair of probabilities belonging to an order should have a probability 'between them' (TP: 41).Therefore, the function of probability, if it exists, is not necessarily continuous. Poincare's conventionalist hypothesis is rejected by Keynes as theoretically unacceptable - it tacitly assumes that probability is 'a regular, continuous function and with continuous differential coefficients' - (TP: 52-3). Furthermore, an order is not necessarily complete.

The real problem for a quantitative comparison of probabilities is how and when it is possible to order the different degrees of probability, the certainty and the impossibility, that is, how and when we can speak of ordered series for probability (TP: 41, 44). Two observations are to be made before answering this crucial question, which will be done in the next subsection. Firstly, Keynes thinks that the ordering of probabilities should never be tacitly assumed:

> we can only build up these ordered series in special cases. If we are given two distinct arguments, there is no general presumption that their two probabilities and certainty can be placed in an order. The burden of establishing the existence of such an order lies on us in each separate case. An endeavour will be made later to explain in a systematic way how and in what circumstances such orders can be established ... For the present it has been shown to be agreeable to common sense to suppose that an order exist in some cases and not in others (TP:41)

Secondly, the ordering of probability is not possible *in general*. Degrees of probability can be arranged in an order only for a few types of probability relative to particular propositions and arguments (TP: 58). Furthermore, this can be done only in restricted circumstances. As we will see, quantitative characteristics of probability can be considered only in situations when there is 'more reason for one conclusion than for the other' (TP: 40). .

CASE-III: non quantitative comparison of probabilities and incommensurability

CASE-III of my classification is the most articulated and it is also the most relevant to Keynes and to my interpretation of Keynes's method, as it is implies the intrinsic incommensurability ('indeterminateness') of probability. Non quantitative comparison of probabilities arise in two situations, which I call CASE-III(i) and CASE-III(ii):

| |
|---|
| CASE-III(i): when probabilities, though non quantitatively comparable, can be arranged in an order of magnitude |
| CASE-III |

> CASE-III(ii): when probabilities cannot even be arranged
> in an order of magnitude

CASE-III(i) considers situations in which different orders of probability exist:

> Some probabilities are not comparable in respect of more and less, because there exists more than one path, so to speak, between proof and disproof, between certainty and impossibility; and neither of two probabilities, which lie on independent paths, bears to the other and to certainty the relation of 'between' which is necessary for quantitative comparison (TP:37-8)

In this case quantitative comparison among different orders is impossible due to the 'intrinsic' incommensurability of magnitudes. Keynes draws an analogy with the relations of orders of likeness between objects. Keynes utilizes a diagram which is useful here (TP: 42):

Figure from TP, p.42

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-------------------------
0                       1
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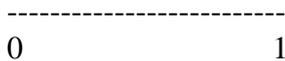
We have seen that in CASE-II, if we can arrange each degree of probability in an order, we can compare probabilities belonging to the same order. In this CASE-III(i), we cannot compare, in general, probabilities belonging to different orders: probabilities U and V in the diagram are of this type. Quantitative comparison of probabilities belonging to different orders is possibile only if the different orders cross each other: in the diagram, probability V is quantitatively less than X and Y. A same degree of probability can, therefore, belong to more than one order, as does probability W. In fact, the two orders cross each other at that point.

In CASE-III(ii), the quantitative comparison of probabilities is not possible because the degrees of probability cannot even be arranged in an order of magnitude (Carabelli 1988:49). This case has been neglected by other interpreters of Keynes's view of probability, sauf by Meeks (1991:146) and even denied by others (Dardi 1991). In TP (1921), Keynes asks himself: 'But in another class of instances is it even possible to arrange the probabilities in an *order* of magnitude, or to say that one is the greater and the other less?' (TP: 31 Keynes's italics). He makes two examples where probabilities cannot even be arranged in an order. The first is relative to inductive arguments:

> Consider three sets of experiments, each directed towards establishing a generalisation. The first set is more numerous; in the second set the irrelevant conditions have been more carefully varied; in the third case the generalisation in view is wider in scope than in the others. Which of these generalisations is on such evidence the most probable? There is, surely, no answer; there is neither equality nor inequality between them. We cannot always

weigh the analogy against the induction, or the scope of the generalisation against the bulk of evidence in support of it. If we have *more* grounds than before, comparison is possible; but, if the grounds in the two cases are quite different, even a comparison of more and less, let alone numerical measurement, may be impossible.' (TP: 31-2, Keynes's italics)

Keynes's second example which I will jokingly call the 'umbrella dilemma' is the following:

Is our expectation of rain, when we start out for a walk, always more likely than not, or less likely than not, or as likely as not? I am prepared to argue that on some occasions none of these alternatives hold, and that it will be an arbitrary matter to decide for or against the umbrella. If the barometer is high, but the clouds are black, it is not always rational that one should prevail over the other in our minds, or even that we should balance them, - though it will be rational to allow caprice to determine us and to waste no time on the debate (TP: 32)

In reading the first example, the reader should take note of Keynes's italics. If we have 'more grounds than before', the ordering of probabilities in terms of equal, more or less is possible; if, on the contrary, the 'grounds are quite different', it is impossible. So, the impossibility of ordering probabilities is due to the heterogeneity of reasons (grounds or evidence).

We can now fully grasp why the quantitative characteristics of probability can be considered only when we are in situations represented by *more or less reasons* (grounds or evidence). And why this is impossible in situations represented by *different* reasons. In fact, the arranging of reasons in terms of more or less requires, as a preliminary condition, that these reasons should be *homogeneous*. In situations of heterogeneity of reasons, we cannot say that we have more or less reason for a conclusion rather than for another. Then, the ordering of probabilities is impossible.

In Keynes's second example it is clear that the motive for the impossibility of ordering is due to heterogeneity of reasons. 'High barometer' and 'black clouds' are clearly heterogeneous and opposite reasons. It is therefore this heterogeneity of reasons which is at the basis of the impossibility of ordering and quantitatively comparing probabilities.

The hypothesis of homogeneity

The conditions to establish the equality or inequality between probabilities require that the material of probability have characteristics of homogeneity, otherwise problems of incommensurability arise. In CASE-II of my classification, the quantities of probability are homogeneous; so they can be arranged in an order and then quantitatively compared within the order. In CASE-III, these conditions cannot be fulfilled. The different quantities of probabilities are heterogeneous and, for this reason, are, in general, quantitatively non comparable. In CASE-III(i) non comparability is due to heterogeneity in the orders of probability whereas in CASE-III(ii) non comparability is due to the impossibility of ordering probabilities because reasons are themselves heterogeneous.

At this point, I can affirm that CASE-III represents the situation where the above conditions to establish the equality or inequality of probabilities does not exist. So, CASE-III covers the discarded situations of CASE-II, i.e. it represents the awkward situations where probabilities are neither equal nor unequal. In these cases the conditions for the calculus of probability do not exist. As we will see later, the appropriate tools of reasoning in these cases are ordinary language and justified (reasoned) common sense.

Let me say immediately that, for Keynes, these discarded cases are neither few nor irrelevant. In 1907 PP, at the end of his discussion upon the conditions for ordering, he indeed states that these 'cases unfortunately comprise the majority of the judgements of probability with which we are in practice concerned' (PP: 125). In his approach to probability, Keynes considered CASE-III of incomparable and non orderable probabilities as the most general; the other two cases, CASE-I and CASE-II, represent the working of probability under limited conditions. CASE-III will soon be joined by new cases concerning the incomparability of joint judgments of probability, the weight of argument and goodness together. CASE-III is not only the most *general* case in TP, but is also the most relevant to my interpretation of Keynes's method in economics. It represents Keynes's own *general* view of probability, upon which he grounds his notion of uncertainty and also his approach to the measurement and comparison of economic magnitudes (utility 1905 and 1909; the general price level in his 'Essay on Index Numbers' 1909, *Tract on Monetary Reform* 1923, *A Treatise on Money* 1930; real capital (GT); output as a whole (GT, chp 4); his approach to goodness 1905, to beauty and aesthetics (1905), as well as his approach to international relations in 1913, 1919 and 1945.

Complex and incommensurable magnitudes:
- TP's probability 1904, 1907-8, 1921
- utility 1905, 1909
- goodness 1905
- beauty 1905
- the general price level (Essay on Index Numbers 1909; Tract 1923; Treatise on Money 1930),
- real capital (GT 1936)
- aggregate income (GT, chp 4).

My point is that in TP Keynes conceives probability as a non comparable and a non orderable quantity in general. The neglect of this as a general case is at the basis of the misinterpretation of Keynes's view of probability and rationality advanced by some other interpreters, particularly by O'Donnell (1989). According to him, Keynes in TP would hold a view of strong rationality based on known probabilities only later to move, in the GT, to a more radical

concept of uncertainty and weak rationality based on unknown probabilities. He suggests that there is an internal shift of emphasis after Ramsey's 1926 criticism (Ramsey 1926).The 'indeterminate domain' and the weak rationality which has a marginal role in TP is increasingly widened to become dominant in the GT.

Actually, Keynes's uncertainty does not depend on whether probabilities are known or unknown, or whether or not expectations are reducible to probabilities. O'Donnell (1991:15) maintains that in the TP's indeterminate domain of weak rationality, expectations are not reducible to probabilities because these are unknown for want of reasoning power. In my view, in response to Ramsey's criticism, in 1931 Keynes does not change substantially his view on the *intrinsic* incommensurability of probability as well as he did not change his logical approach to probability in response to Whitehead, Moore and Russell's earlier criticisms. Intrinsic incommensurability depends neither on want of reasoning power nor on ignorance.

CASE-III is also the situation which best characterises Keynes's conception of uncertainty in GT: a situation where the conditions for calculus, that is ordinability and comparability (either numerical or quantitative) between the quantities of probability, do not exist. But where quantities of probability do exist and a choice between these quantities is to be made, in whatever manner. This will be the topic of rational dilemmas and irreducible conflicts which we will see below in section 4. In 1936, Keynes writes that 'the basis for making such calculations does not exist'. In 1921, in the umbrella dilemma, the determinacy of choice is secured by 'caprice'. In 1936, by 'animal spirits' or by 'whim, sentiment or chance'. No such a big difference exists between these two situations:

> 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 alternatives as best we are able, calculating where we can, but often falling back for our motive on whim or sentiment or chance (GT, CW VII: 162)

To speak of 'non probabilistic uncertainty' as O'Donnell (1991: 20) does, is as equally unacceptable as his old interpretation. He suggests that when there is no numerical or quantitative comparison, then there are no quantities of probability at all; or, if they do exist, they are unknown. So probabilities have no domain, not even ordinary language. This leaves out all the problems of incommensurability of magnitudes, tragic dilemmas and irreducible conflicts, which are at the centre of Keynes's attention throughout his life and also his positive constructive way of dealing with them. Irreducible uncertainty is not due to unknown probabilities. This is a situation of total ignorance. Keynes' 1937 sentence 'we simply do not know' does not mean, as suggested by

O'Donnell, that we do not know the probabilities. It means that we do not know the calculable probabilities. In fact, Keynes writes: 'there is no scientific basis on which to form calculable probabilities whatever' (CW XIV: 114).

Joint judgements: direct and organic judgements
New cases of non comparability and incommensurability are to be introduced to complete my analysis of Keynes's attitude to the measurement and comparison of probability. Until now judgments of probability alone have been considered. I shall now consider situations where these judgements are associated with other judgements to form *joint judgements*: joint judgements of probability and the weight of argument; joint judgements of probability and goodness.

Joint judgements of probability and the weight of argument
The weight of argument allows quantitative comparisons between arguments on the basis of a valuation which is different from that of probability. It pays attention to the absolute amount of relevant knowledge (TP: 77). In 1907 PP, Keynes calls these joint judgements, judgements of the intensity of probability; in 1936 GT, judgements of confidence. As for probability, numerical and quantitative comparisons of the 'weight of argument' are limited to restricted cases (TP: 77-8). Difficulties of comparison build up when joint judgments of probability and the weight of argument are considered. First, there are the difficulties of ordering probability and weight respectively. Second, and quite apart from these difficulties, the new joint judgement of probability and weight is not strictly dependent on the two separate orders, even when these orders can be established. In particular, the new direct joint judgement does not depend on the sum or the product of the quantities of the two different orders. It is a new *direct and organic* judgement on the situation as a whole. In 1907, Keynes maintains that most of the judgements we use in practice are actually joint and organic judgment of these two orders of reasoning and not judgements of probability alone:

> Finally, may not the direct and instinctive judgements of probability by which we are guided in practice be no judgements of probability at all but joint and organic judgements of probability and intensity? This is by no means impossible. The element of intensity may seldom affect the final order of magnitude ... But on fundamental points the difficulty in discovering a logical development of pure probability, which is in conformity with the direct and instinctive judgements of commonsense, may easily be due to the fact that it is not really with judgements of pure probability that commonsense is ordinarily concerned (PP: 129-30)

It is also this type of joint judgment which represents Keynes's notion of uncertainty in chapter 12 of GT:

> it would be foolish, in forming our expectations, to attach great weight to matters which are very uncertain ... The state of long- period expectation, upon which our decisions are based, does not solely depend ... on the most probable forecast we can make. It also depends on the confidence with

which we make this forecast ...The state of confidence ... is a matter to which practical men always pay the closest and most anxious attention. But economists have not analysed it carefully (GT: 148)

Joint judgements of probability and goodness: right conduct

Keynes also considers the difficulties of comparison of the joint judgements of probability and goodness. If we are in situations where we cannot order the degrees of probability, the incomparability of the joint judgement derives again from this basic difficulty. More interesting is his discussion of situations where we have the two different orders: one of probability and one of goodness. Keynes maintains that difficulties of quantitative comparison can even arise in this more favourable situation. On this case a considerable amount of evidential material is available covering over 40 years of Keynes's intellectual career. It covers both the early (1907-1921) and the mature (1938-1944) periods, apparently without solution of continuity in his approach to the quantitative non comparability of such a joint judgement. The existence of the two different orders of probability and goodness is typical of the fundamental situation considered in ethics, that of 'right conduct' or 'duty' in human action. This is also the situation which is the most relevant to the interpretation of Keynes's theory of economic action.

Let us start from Keynes's opening passage of chapter XVI of 1907 PP ('The Relation of Probability to Ethics, and the Doctrine of Mathematical expectation'). This fixes the background of his notion of right action in economics, of his opposition to the Benthamite calculus and also of his attention to incommensurable and complex magnitudes. Recall that, for Keynes, economics is a moral science:

> I do not know of any passage in the ancient philosophers which explicitly points out that the pursuit of good is only a duty in proportion to the agent's reasonable expectations of attaining them. It is, perhaps, part of the explanation of the supposed relativity of good, that this distinction has not been clearly made. The quantity, which figures, when we decide upon our duty, is doubly relative, relative to our powers and relative to our information. This quantity is a complex and a product, one of whose factors is quantity of goodness, but whose relativity is due to the presence of the other factor [i.e. the quantity of probability] (PP: 347; see also TP: 339)

First, the passage shows how the quantity, upon which right conduct or duty depends, is relative to the amount of information (limited knowledge) upon which Keynes's own conception of probability depends. Second, it shows how the problem of right conduct or moral duty in ethics is dealt by him in terms of reasonable action. Right action and duty depend on reasonable contingent action. What matters is the reasonableness, not the absolute rationality, of action. Reasonableness is relative to contingent and changeable cognitive circumstances: as seen, a sort of contingent rationality, comparable to 'phronesis', Aristotle's practical reason in *Nichomachean Ethics*. Third, it

shows how the quantity upon which reasonable action depends is 'a complex and a product' of the quantity of goodness and of the quantity of probability. This quantity is therefore the result of a joint judgement: 'not all products of magnitudes of probability and goodness are comparable' (PP: 353). [12]

It is this difficulty of quantitative comparison of products which lies fundamentally at the base of Keynes's critique of Moore's doctrine of mathematical expectations and of the latter acceptance of the Benthamite calculus. Keynes' 1907 position is in line with his earlier 1904 critique of Moore's theory of action (Keynes MSS 1904 'Ethics in Relation to Conduct'). This new difficulty adds to the other criticisms already raised by Keynes against Moore in 1904: his interpretation of probability in terms of frequency; his overwhelming and defeatist attention to the long run effects of action; his need for certainty rather than probability; his requirement of a numerical measurement of probability.[13] In my opinion, in 1907 Keynes's own 1933 argument against scholasticism, that is the fallacy of dealing with the vague concept of probability as if it was precise (Rymes 1989: 101), is already fully elaborated. We have neither to wait 1936 nor Ramsey's 1926 criticism nor Keynes' 1931 Obituary of Ramsey (Ramsey 1926; Keynes 1931). Keynes will hold it firmly, continuously and coherently, at least until 1944, the last year of which material is available on this point. Keynes's mature position in 1938-39 and 1944 does not change substantially from that of 1907.

In his letters of 27 July 1938 and 7 December 1938 to Townshend, Keynes explicitly refers to his early position in TP. He deals with joint judgements of probability and goodness in a manner similar to CASE-III(ii), i.e. where probabilities cannot even be arranged in an order for the heterogeneity of reasons which back them. In 1907 and 1921 the example is what I have called Keynes's 'umbrella dilemma'; in his letter to Townshend, he refers to Buridan ass's dilemma (but references to Buridan's dilemma are also in his 1907 PP):

> But that still leaves millions of cases over where one cannot even arrange an order of preference. When all is said and done, there is an arbitrary element in the situation ... [I]n

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12 In 1907, he raises the same doubts on the numerical measurement of goodness which he has already raised in his 1905 'Miscellanea Ethica':

> It may be remarked in this connection that the question, whether every pair of goods are numerically comparable even in respect of goodness, has not received a proper consideration. Many such questions of the greatest importance have hitherto escaped attention, on account of the generally received opinion that all magnitudes, of the same kind prima facie, must necessarily be capable of numerical comparison (PP: 354; see also TP: 345, 349).

[13] As seen, for Keynes, probabilities are, in general, neither numerically measurable nor quantitatively comparable save in restricted cases. The calculus of probability and mathematical Benthamite calculus are only applicable in restricted cases. Keynes is in contrast with Moore's theoretical acceptance of the Benthamite consequentialist calculus, even though Moore in practice rejects it as it is impossible to calculate all the future consequences of action. For Keynes, calculus is unacceptable from the *theoretical* point of view, given the problems of incommensurability of probability and goodness.

making a decision we have before us a large number of alternatives, none of which is demonstrably more 'rational' than the others, in the sense that we can arrange in order of merit the sum aggregate of the benefits obtainable from the complete consequences of each. To avoid being in the position of Buridan's ass, we fall back, therefore, and necessarily do so, on motives of another kind, which are not 'rational' in the sense of being concerned with the evaluation of consequences, but are decided by habit, instinct, preference, desire, will, etc. (CW XXIX: 289, 294)

To conclude this section, I will consider the extremely relevant letter which Keynes writes to Werner Stark on February 10, 1944. He comments on the article presented by Stark for the *Economic Journal*, in which the author moves a critique à la Bergson of the foundations of orthodox economics. The methodological difficulty stressed by Keynes against Stark's argument, arises just when a particular economic decision is the result - as a whole and not as a sum or a product - of two different orders of preference, if the latter orders are not numerically measurable or, at least, quantitatively comparable. In Keynes's example, the two orders are, respectively, an order relative to the final results of the action and an order relative to their probabilities. The difficulty is devastating for the very possibility of economic calculus. No logical meaning can be attributed to the product of the single quantities. The new order is not the result of the product of the quantities of the previous orders. It is a new direct judgement on the situation as a whole. I quote a very long passage from this unpublished letter, which, in my view, is quite relevant to grasp Keynes' point:

> I daresay it is true that economists have not paid as much attention to Bergson's criticism of their foundations as they ought, or rather as they should have when Bergson was first writing. For, as I mention below, Bergson is not really up to date in these matters on the lines of more recent thought.
>
> Bergson was pretty completely successful, I should agree, against Fechner or against the sort of things Edgeworth was putting forth when he wrote 'Mathematical Psychics' and 'Metretike'. But the modern psychologists know all this pretty well. Above all Bergson was not enough of a mathematician to appreciate the difference between a concept being quantitative and instances of it being capable of arrangement in an order of magnitude without quantitative relations. He was, of course, quite unacquainted with the modern mathematics of order. His arguments against attributing quantities to degrees of preference are not equally valid against the conception of ranging preferences in an order of magnitude, which is really what the modern economist would do if he were to give more attention to these fundamental matters than is at present the fashion.
>
> In my judgement, the real difficulty arises, and that is something which Bergson does not touch on, when some particular position is the resultant of two distinct orders of preferences, neither of which is strictly quantitative. For example, one can arrange one's preferences for the ultimate end results in an order of magnitude, and one can also range in an order of magnitude the probability or intensity of belief which, in one's judgement, attaches to attaining these end results. Clearly one's action ought to be so governed that the degree of preference multiplied by the degree of probability comes highest. The trouble is, however, that no logical meaning can be attached to this. The order of preference for the purpose of choice, which takes account both of the value of results and the probability of

getting them, has, it seems, to be arrived at by quite a distinct direct process. All this, I agree, economists are in the habit of neglecting. But, if one is to tackle this subject, one has to tackle it, I think, on these lines rather than on what are to the modern mind the rather elementary and old-fashioned concepts of Bergson (MSS 1944, Letter to Werner Stark).

The methodological difficulty pointed out by Keynes to Stark in 1944 is in line with his early position in 1907. Indeed, in the letter Keynes appears unusually modest. In my 1994 article on 'Keynes on Mensuration and Comparison' I have shown how Keynes's position is the outcome of his early critique of Bertrand Russell's philosophy of measurement. Russell's *Principles of Mathematics* (1903) is the starting point of 'modern mathematics of order', which Keynes refers to in his letter to Stark.

To clarify Keynes' general approach, we have to investigate his own philosophy of measure. This new perspective is also needed to grasp Keynes's economics; he applies this philosophy of measure not only to his notion of probability and uncertainty, but also to the measurement and quantitative comparison of macroeconomic magnitudes, such as the value of money, utility, aggregate capital and output as a whole.

Keynes's philosophy of measure: intrinsically incommensurable magnitudes

Keynes maintains that probability relations have an 'intrinsic', 'essential', quantitative incommensurability or 'indeterminateness'. The impossibility of a numerical measurement, of a quantitative comparison, or of ordering of probability is not ascribed to our incapacity, lack of knowledge or skill but to the nature of the material of probability itself. In this sense, this impossibility is 'absolute and inherent in the subject matter' (PP: 65). The magnitudes of probability are 'essentially' indeterminate because there is no determinacy in their units of quantity. Their units belong to 'different kinds' of magnitudes of probability:

> they are 'essentially' indeterminate ... I say 'essentially', because this indeterminacy is not simply relative to our knowledge or to a particular set of premises, but is absolute. We have to do with different kinds of the same species of quantity, whose units are essentially indeterminate in terms of one another, but which are sometimes comparable within certain limits. The case is not to be compared to that of a real number … and a rational number ... In these probability scales a new conception of relative indeterminacy of units of magnitude must be introduced. For although we can always express one unit in terms of another to some degree of approximation, there are strict limits to this and we cannot increase at will the closeness of the approximation (PP:65).

This intrinsic indeterminateness is stressed again in the final version of TP. In fact, a general, or in Keynes's words, a 'natural', 'common' unit of measure does not exist for probability. Probability is not homogenous magnitude, as 'a degree of probability is not composed of some

homogeneous material'. Furthermore, as we will see later, the atomic hypothesis cannot be applied to it, as the material of probability is not 'divisible in to parts of like character with one another':

> It is not the case here that the method of calculation, prescribed by theory, is beyond our powers or too laborious for actual application. No method of calculation, however impracticable, has been suggested. Nor have we any *prima facie* indications of the existence of a common unit to which the magnitudes of all probabilities are naturally referrable. A degree of probability is not composed of some homogeneous material, and is not apparently divisible into parts of like character with one another ... Probabilities do not all belong to a single set of magnitudes measurable in terms of a common unit (TP: 32-3; on measurability in terms of a common unit see also pp. 35-6).

Given this intrinsic indeterminateness, a multiplicity of different units of quantity and of measure of probability relations exists. This variety of quantity and measure depends on the nature of the material under investigation. Keynes maintains that probability relations are of different kinds and are characterized by a multiplicity of units of measure: 'the magnitudes of probability relations must be measured in various units according to the particular case in question, these units being incommensurable among themselves' (PP:67). This raises the problem of the variety and heterogeneity of the quantities of probability and of their incommensurability. On this aspect, as we will see in section 4., Keynes echoes Aristotle's criticism of Plato based on the heterogeneity of ethical values and on their non-commensurability in *Nichomachean Ethics*, which we know Keynes read in 1906 (Keynes MSS Books read on 1905-6). Plato held that the hallmark of rational choice is the measurement of all alternatives by a single quantitative standard, metric or scale. This was done by supposing a qualitative homogeneity of all the values, i.e. the Platonic notion of the Single Good. Aristotle, on the contrary, held that this approach renders intractable the problem of choice among heterogeneous alternatives and neglects the qualitative heterogeneity of values (beauty and goodness for instance). On this issue see Nussbaum (1985, 1986).

The existence of different orders of probability relative to the different kinds of magnitudes is like the existence of different orders of similarity between two complex objects. Their different qualities (attributes) move in different directions originating increasing and diminishing orders. In these cases, it is impossible to quantitatively compare the two complex objects as a whole - and even less to compare them numerically: 'It is not possible to say of every pair of objects which of them is *on the whole* the more like a third object' (TP:122 my italics). Keynes's example in chapter 3 of TP helps us to understand this type of incommensurability and complexity:

> For instance, a book bound in blue morocco is more like a book bound in red morocco than if it were bound in blue calf; and a book bound in red calf is more like the book in red morocco than if it were in blue calf. But there may be no comparison between the degree of

similarity which exists between books bound in red morocco and blue morocco, and that which exists between books bound in red morocco and red calf (TP: 39)

The objects in Keynes's example (the two books in this case) are characterized by different qualitative attributes - such as the type and colour of the binding of the two books -, which are not numerically measurable. If objects of this kind exist, then their quantitative comparison, as a whole, is impossible. A partial comparison between them is, however, possible if we concentrate - by some direct judgement of favourable or unfavourable relevance - on just one relevant attribute at a time: in Keynes's example, 'morocco-binding' and 'redness' respectively. But it is, however, equally very difficult to make - so to speak - a second level of comparison between the degrees of the two already established orders of comparison (unless the two orders, by chance, intersect each other at some point, like point W in Keynes's diagram above). The situation is similar to that of trying to form a new joint judgement of similarity, starting from some already established orders of similarity, so bringing the two orders of similarity together as a whole: to establish a new order of similarity over the orders of similarity already established.

2.3 *From probability to economic quantities*

Keynes transfers this philosophy of measure and comparison of probabilities to macroeconomic magnitudes. He also transfers the problems of intrinsic incommensurability and complexity. His 1909 'Essay on Index Numbers' is the work in which this transfer takes place. In this essay Keynes presents his philosophy of measurement of economic quantities.

Firstly he distinguishes between two classes of quantities in economics:

1) the first class includes quantities which are perfectly definite and capable of measurement but where we are incapable of measuring them;

2) the second class includes quantities which are intrinsically in themselves, in their nature, incapable of measurement.

In economics, according to him, quantities of the second group are numerous. In the essay he lists: the general price level and 'the total national income seen as the aggregate of utilities enjoyed by all the individuals'. Later he will add the quantity of real aggregate capital and income as a whole.

Secondly, in his 1909 Essay he discusses the logical rather than mathematical difficulties in measurement; difficulties, he writes, which "depend rather upon reasoning than upon calculation". He also points out that this "difficulty of measurement is intrinsic and inherent in these magnitudes and does not depend on our inability to measure them (CW XI: 52, 135). He aims at 'a philosophical discussion of these ideas, postponing the mathematical difficulties of our subject but facing those

which depend rather upon reasoning than upon calculation' (CW XI: 64). So, similarly to probability, he tackles the logical and philosophical difficulties of the measurement of economic magnitudes, not the mathematical ones.

In my view Keynes considers these economic magnitudes similar to probability from the standpoint of the philosophy of measurement, quantitative comparison and incommensurability. Note that in the 1909 Essay Keynes never explicitly refers to the logical relation of probability as the nearest analogy of the relation of price. But, as you will see soon, the two are strikingly similar. It is in particular his discussion on the measurement of the general price level and aggregate utility which best shows the common roots of the philosophy of probability and of economic magnitudes.

General price level

To grasp the parallel between Keynes' analysis of probability in 1907 and his analysis of price in 1909, the characteristics of Keynes's view of probability can be briefly resumed as follows: a) probability is a relation; b) this relation is a quantity; c) probability relation is in general a non-numerically measurable quantity (for Keynes a quantity is not necessarily a number); d) probability relation is an intrinsically indeterminate quantity (the impossibility of a measurement of probability is due to its intrinsic nature and not to lack of knowledge or incapacity to measure it); e) an absolute unit of measure of probability does not exist; therefore there is a multiplicity of units of quantities of probability.

In the 1909 Essay, Keynes analyses first the price of a particular commodity, then of the general price level. He points out that: a) price is a relation; b) the price relation is a quantity; c) price relation is in general a non-numerical quantity. The main characteristics of the general price level are: a) the general price level is a relation; b) it is a complex relation ("the complex relation of money to the commodities" CW XI, 66); c) the general price level is a non-numerical quantity; d) it is an intrinsically indeterminate quantity; e) fallacies of composition may arise (the properties of the particular price relations cannot be extended to the general level of price without falling into logical fallacies of composition); f) there is a plurality of price-levels. This again is similar to the multiplicity of the units of quantity of probability.

So, as the quantities of probability are of 'different kinds'; the same goes for economic quantities. Both probability and economic quantities are also characterized by three degrees of 'intimacy', that is our three CASES (CASE I-II-III). The lowest degree is represented by heterogeneous quantities - such as the quantities of a ton and of a mile - incomparable and incommensurable between them:

Everybody recognises that there are different kinds of quantities. We do not suppose that, because a ton is a quantity and a mile is a quantity, we can therefore compare the magnitudes of a ton and a mile. There are also admitted instances of quantities between which there is an intermediate degree of intimacy; they are, that is to say, not as completely disparate as a ton is from a mile, and yet not capable of the numerical relation which exists between one mile and two miles. We may give the example of degree of similarity. A green octavo volume is more like a green folio than a red octavo is, but it would be evidently false to say that it is twice or any other number of times as like. We may say that a set of quantities are of the same kind when each of the set can be compared in respect of more and less with each of the others, and that they are in the same unit when numerical comparison is possible between every pair of the set ... A numerical comparison between two aggregates of utilities would only be possible if each of the utilities were strictly of the same kind and if the laws of arithmetic could be validly applied to their summation. This does not seem to be the case (CW XI: 53-4).

In the 1909 essay, even Keynes's words and his analogies (degree of similarity; the green octave volume) are the same of his 1907 PP. The words 'three degrees of intimacy' he uses to indicate the three cases of numerical comparison (CASE-I), quantitative comparison (CASE-II) and non comparability of economic magnitudes (CASE-III) are actually borrowed from it:

three possible degrees of intimacy between the magnitudes of any pair of probabilities. Some cannot be compared at all in this respect; between others the relations of more or less can be established; and others again seem to be capable of numerical measurement in terms of some common unit ... [The first ones] represent pairs of probabilities between which the lowest of the three degrees of intimacy exists; it is impossible to say of either that its is either less or greater than the other, or to compare their magnitude in any respect whatever (PP: 60-2)

And even Keynes's own definition of index numbers makes explicit the theoretical difficulties detected in his philosophy of the measure of probability. He defines index numbers stressing the theoretical difficulties of their construction, not the practical ones. The series of quantities should have the same kind of relation in the different moments of time, space or class of objects considered. These quantities should be further measurable in terms of the same unit of measure:

An index number is in itself no more than the measure of the magnitude of an object at one time or in one place in terms of the magnitude of the same or similar object at another time or in another place. If we are dealing with a series of quantities f(t1),f(t2),each of which has the same relation to different moments of time or parts of space or classes of objects, and which are all numerically measurable in terms of a common unit, then the ratio [100 F(t2)/f(t1)] is defined as the index number of f for the time or place or class t2 referred to its value for t1 as base (CW XI:51-2; my italics)

Besides, his stress on the theoretical necessity of making explicit the system of 'weighing' in the building of index numbers shows a further striking parallelism with his attitude in probability: the necessity to make explicit the implicit direct judgements. The weighing of index numbers

parallels the role of direct judgements of relevance in probability. In fact, in TP, judgements of relevance are connected with the weight of argument.

Utility

Keynes's analysis of the measurement and comparison of utility is also quite articulated and begins in 1905 in his 'Miscellanea Ethica'. It runs through his 1909 'Essay on Index Numbers' down to 1930 *A Treatise on Money* and later writings. It covers both the problems of the non-homogeneity of utility, of the non-interpersonal comparison of utility, of the measure of the amount of utility which a given sum of money purchases and of the non-exact measurement of utility due to organic unities. To the 'esteem value standard' which is at the basis of the theory of utility value, Keynes applies the same criticism we have already seen he applied to the general level of prices: a) the aggregate of individual utilities is a complex not a sum; b) it is also a non-numerical magnitude; c) the laws of addition and multiplication do not apply to it and so on. An aggregate of utilities is not a sum:

> The measure of the amount of utility, which a given sum will purchase, is intrinsically and from the nature of the case beyond our reach. Since the total utility of a commodity is not proportional to its quantity, we have no means of comparison between two different total utilities which are part of differing wholes, and the total utility of a given amount of wealth depends upon its distribution… Even if we know the distribution of wealth, there is no *measure* of the aggregate of individual utilities. The aggregate exists and is perfectly determinate, but we must not infer from this that two such aggregates can be measured in terms of a common unit. … There is an aggregate of utilities, we may say, but not a sum (CW XI: 59-60)

2.4 Incommensurability and incomparability due to heterogeneity in dimension

At this point, we can also answer a further question: whether the heterogeneity in kind of quantities of probability and of economic quantities is due, not only to 'complexity' or 'manifoldness', (an 'ensemble' of heterogeneous qualitative attributes), but to multidimensionality. In brief, the question is whether there is also heterogeneity in the dimensions of the quantities of probability and of economics, like the dimensions of beauty and goodness.

It is difficult to answer, in a definite manner, the question about the heterogeneity of the dimension of the quantities of probability. In his 1907 version of TP, Keynes maintains that the quantities of probabilities belonging to different orders - though heterogeneous in kind - are not completely in different dimensions like those of beauty and goodness (PP:65). In the final version of TP, this remark is absent. Keynes only refers to heterogeneity in dimension in three contexts:

> i) joint judgements of probability and the weight of argument. Keynes refers here to the weight and probability as 'independent properties' of the argument (TP: 83) or 'as two independent dimensions in which the judgment is free to move'(TP: 85)

ii) joint judgements of probability and goodness. Keynes quotes a passage from Leibniz' *Nouveaux Essais* (Book II, chapter xxi): 'in such judgements..." as in other estimates disparate and heterogeneous and, so to speak, of more than one dimension, the greatness of that which is discussed is in reason composed of both estimates (i.e. of goodness and probability), and is like a rectangle, in which there are two considerations, viz. that of length and that of breadth"'(TP: 340-1).

iii) lastly, when the measurement and comparison in space and time of the 'composite quantity' representing the value of money are discussed: 'where we seek to build up an index number of a conception, which is quantitative but is not in itself numerically measurable in any defined and unambiguous sense'(TP: 237). He considers explicitly the 'variations of different type' of the value of money (TP: 235). In this section of 1921 TP, we also find some arguments of his 1909 Essay on index numbers.

It is, however, in his economic writings that Keynes explicitly refers to multidimensionality of economic magnitudes, due to their heterogeneity in dimension. First, in his 1909 'Essay on Index Numbers'; later, in 1930 TM and in 1936 GT. In the 1909 Essay, Keynes reports Bourguin's remark on the value of money: 'Le pouvoir de la monnaie n'est qu'un mot; il ne désigne pas une qualité, mais un ensemble de rapports qui n'ont rien de commun entre eux, n'étant pas des équations entre grandeurs de meˆme espèce' (CW XI: 67). In his TM, where we find his most well known reference to 'complex' and 'manifold' magnitudes, Keynes refers to 'incommensurable directions', not to multidimensionality:

> This difficulty in making precise quantitative comparisons is the same as arises in the case of many other famous concepts, namely of all those which are complex or manifold in the sense that they are capable of variations of degree in more than one mutually incommensurable direction at the same time. The concept of purchasing power, averaged over populations which are not homogeneous in respect of their real incomes, is complex in this sense. The same difficulty arises whenever we ask whether one thing is superior in degree to another *on the whole*, the superiority depending on the resultant of several attributes which are each variable in degree but in ways non commensurable with one another (TM:88, Keynes's italics)

In this passage, he also explicitly refers to his discussion of non numerical measurement and non quantitative comparison of probability in TP (TM: 88, fn.2). However, he refers to heterogeneity in dimension in the preceding page: 'we can give no meaning to a numerical comparison between the purchasing power of money to a poor man and its purchasing power to a rich man, the two things being, so to speak, in different dimensions' (TM:87). Lastly, he refers to heterogeneity due to multidimensionality in GT's famous passage of chapter 4, where the comparison is between magnitudes of goodness and happiness which move in opposite directions:

> To say that net output today is greater, but the price level lower, than ten years ago or one year ago, is a proposition of similar character to the statement that Queen Victoria was a

better queen but not a happier woman than Queen Elisabeth - a proposition not without meaning and not without interest, but unsuitable as material for differential calculus (GT: 40)

This passage if read along the interpretation here suggested, i.e. in terms of complexity or manifoldness also due to heterogeneous dimensions, acquires a new light. In Keynes's example, the dimensions of happiness and goodness are heterogeneous. Thus, the two complex objects to be compared as a whole (the two queens - one better but unhappier than the other) are incommensurable and non comparable due, not only to an ensemble of heterogeneous attributes, but to heterogeneity in dimension. Here not only numerical comparison is in question, as Keynes's remark on the impossibility of differential calculus would suggest, all quantitative comparisons are in doubt.

New elements on the continuity in Keynes's methodological approach emerge. Neither in probability nor in economics (either numerical or quantitative) comparison of non-homogenous items is possible: 'a quantitative comparison of the eventual real capital after the elapse of an interval of time with the initial real capital... would involve a problem, insoluble except in special cases, of the quantitative comparison of non-homogenous items' (CW XIII:471).

Neither in probability nor in economics comparison as a whole (either numerical or quantitative) is possible between 'complex or manifold' objects characterised by an ensemble of heterogeneous qualitative attributes moving, in a non proportional way, in different and opposite directions at the same time. Even worse if we are comparing objects whose attributes move in different dimensions, like time and space or goodness and happiness. These non homogeneous complexes are characterised by heterogeneous attributes which move, in different directions, eventually belonging to different dimensions. Output as a whole is one of these 'complex or manifold' magnitudes: 'a non homogeneous complex which cannot be measured ... except in certain special cases, as for example, when all the items of one output are included in the same proportion in another output' (GT: 38). It is one of those 'incommensurable collections of miscellaneous objects' (GT: 39). Both probability and these economic quantities are intrinsically non precise, vague quantities, like the GT 'vague and non quantitative concepts'. Whether - as for macroeconomic magnitudes like output as a whole, the general price level, aggregate capital and aggregate utility - we can speak for probability too of incommensurability due to heterogeneity in dimensions remains an open question. As seen, in 1907 Keynes denies this for probability judgements alone, admitting it only for joint judgements.

2.5 Keynes's choice of the units of quantities and measure in economics

This explains Keynes's attention to the choice of units of quantity and measure in probability ('we have no "prima facie indications of the existence of a common unit to which the magnitudes of all probabilities are naturally referrable' TP: 32) and in macroeconomics ('difficulties as to the definition of the physical unit of capital' GT: 138). He is aware that it is impossible to define the 'natural' unit of probability; as well his attention is equally devoted to the choice of the different units of quantities appropriate to economics as a whole. In the *General Theory*, Keynes argues that the choice of units was one of 'the three perplexities which most impeded my progress in writing this book, so that I could not express myself conveniently until I had found some solution for them' (CW VII: 37). Complex economic quantities call for a theory of the units of quantities appropriate to them and this also means having an appropriate theory of measurement. In the General Theory Keynes tackles the negative task of criticizing classical theory in Chapters 2 and 3. However, before moving to the positive side of his theory he devotes four chapters to the discussion of methodological problems. One of these problems is 'the choice of the units of quantity appropriate to the problems of the economic system as a whole' (CW VII: 37). In chapter 4 of GT Keynes aims to show how his choice of units in the *General Theory* reflects his vision of a monetary macro-economy as a complex system requiring a complex theory. His choice reflects the object and the method of his investigation. The object is the level and changes in real income and employment resulting from aggregate demand. His method is a way of reasoning which deals with incommensurability of magnitudess:

> It is my belief that much unnecessary perplexity can be avoided if we limit ourselves strictly to the units, money and labour, when we are dealing with the behaviour of the economic system as a whole; reserving the use of units of particular outputs and equipments to the occasions when we are analysing the output of individual firms or industries in isolation; and the use of vague concepts, such as the quantity of capital equipment as a whole and the general level of prices, to the occasions when we are attempting some historical comparison which is within certain (perhaps fairly wide) limits avowedly unprecise and approximate (CW VII: 43)

In my paper 'Organic Interdependence and Keynes's Choice of Units in the General Theory' (Carabelli 1992), I have thoroughly examined the development of Keynes' choice of units since 1907 up to and including the *General Theory*. I have shown that there is nothing new in Keynes's approach to complex magnitudes and to their units of quantity and measure found in the *General Theory*. He has already considered them in at least four of his previous writings. He does this in 1907, in the first version of his dissertation *The Principles of Probability* (later *A Treatise on Probability* 1921), while considering the measurement of the relation of probability; in his 'Essay on The Method of Index Numbers' while considering the measurement of price level; in his analysis of the price level in the *Tract on Monetary Reform* (1923) and in *A Treatise on Money* (1930).

Units of time and comparison in time and space

His attention is also devote to the units of time: the 'production period' which corresponds to the time necessary to produce investment goods; the 'accounting period' and the 'daily' period which are connected to the determination of employment. 'The importance of the accounting period lies in the fact that all decisions to employ labour depend on expectations covering this period; though some of these expectations depend in turn on expectations covering the longer period' CW XXIX: 74). And: 'Daily here stands for the shortest interval after which the firm is free to revise its decision as to how much employment to offer. It is, so to speak, the minimum effective unit of economic time' (GT, CW VII: 47)

This further explains his scepticism on the possibility of quantitatively comparing economic magnitudes in space (denying all comparisons of wellbeing) and of dealing with economic variations in time, i.e. his approach to economic dynamics and historical time in economics: 'The problem of comparing one real output with another ... presents conundrums which permit...of no solution' (GT, CW VII: 39). And: 'It does not enable us to make the comparison for communities as a whole, unless the change in the purchasing power of money ... is uniform for all the different levels of real income' (TM, CW V: 87)

Variation and change in economic variables are not mechanical but qualitative and organic. Time is not homogeneous and there is further organic unity through time. This empties all the naif attempts of measuring and quantitatively comparing economic magnitudes through time. Yet, again, as happens for non comparable probabilities where direct judgements, caprice or habits equally play a role, the same happens for incomparable economic quantities. Here too, arbitrariness in the choice does not imply total indeterminacy:

> The fact that two incommensurable collections of miscellaneous objects cannot in themselves provide the material for a quantitative analysis need not, of course, prevent us from making approximate statistical comparison, depending on some broad element of judgement rather than on strict calculation, which may possess significance and validity within certain limits (GT:39)

This is also Keynes's position in chapter 8 of TM ('The meaning of comparisons of purchasing power'), when he examines the possible methods of arriving at approximations of the relative purchasing power of incomes, distinguishing between the direct method of comparing incomes of similar persons and various indirect methods of comparing prices of equivalent composite commodities. In his view, it always possible to use the direct method of comparison by the application of TP's direct judgements:

> This method ... is, in fact, the method which is most often employed by common sense. It depends on a commonsense judgement of degrees of well-being by persons who have a

general acquaintance with the conditions of life in both of the two positions under comparison (TM CW V: 89-90)

"our task ...in not to prove something, but to elucidate by means of reflection a precise definition which shall correspond as closely as possible to what we really mean by a term in common use" (TM 86)

But there are limits to all of these methods, which Keynes explains in typically piquant illustrations, underlying the impossibility of weighing and comparing satisfactions in time or among heterogeneous objects:

We are not in a position to weigh the satisfactions for similar persons of Pharaoh's slaves against Fifth Avenue's motor cars, or dear fuel and cheap ice to Laplanders against cheap fuel and dear ice to Hottentots ... We cannot hope to find a ratio of equivalent substitution for gladiators against cinemas, or for the conveniences of being able to buy motor cars against the conveniences of being able to buy slaves (TM 104-109).

2.6 The atomic hypothesis. Organic interdependence. Wholes and parts

We have seen so far that the conditions to establish the equality or inequality between probabilities require that the material of probability should have characteristics of homogeneity. We now investigate Keynes' second condition: atomicity (independence, divisibility, finiteness, symmetry of alternatives and completeness); otherwise, new fallacies arise. I have anticipated that atomism cannot be applied to probability, as the material of probability, in addition of being non homogeneous ('a degree of probability is not composed of some homogeneous material'), is not in general 'divisible in to parts of like character with one another' (TP 32-3). This raises the problem of the concepts of parts and wholes, of organic interdependence between parts and eventually of organic unities, as to probability, goodness, utility and economic magnitudes. This also raises the question on whether the whole is an additive sum and whether we risk falling into the fallacy of composition ('fallacy of independence' or 'false independence' as Keynes also calls it in TP (TP 191). Logical fallacies lead us 'into error' in our economic reasoning (GT 297). In fact, the relation between the parts and the whole is to be connected, in addition to complexity and incommensurability, with fallacious probable inferences and causality.

Keynes's notion of interdependence and complexity in economics is again connected with his view on probability. He maintained that probability and its material are, in general - except in particular limited cases - non atomic: "A degree of probability is not composed of some homogeneous material, and is not apparently divisible into parts of like character with one another" (TP: 32). The fact that probability (and the material of probability that is propositions, arguments and evidence) is not, in general, divisible into parts of like character, which are homogeneous - means that it is non atomic. It is indivisible and (partly or entirely) organic: either

it is an organic whole or its parts are somewhat (entirely or partially) organically interdependent. Thus the relation between the parts and the whole is organic. It means that it is internal rather than external. The economic material is similar to the material of probability: it is, in general, except under restricted conditions - characterised by organic interdependence. It means that it is organic (or partly organic) and indivisible.

Keynes's 1904 essay "Ethics in relation to conduct", which, as seen, represents the starting point of his discussion on probability, and his 1905 note in 'Miscellanea Ethica', help us to disentangle these aspects. In the last part of his 1904 essay, while considering the theory of equiprobability, Keynes points out:

> "I would say in conclusion that I have avoided all discussion of several interesting points in the theory of equiprobabilities which appears to me to be in contradistinction to the general theory, if there be any theory, a branch of mathematics.
> It must be remembered that there are many dangers and difficulties in applying numerical operations to such problems; and the unpopularity of the principle of organic unities shows very clearly how great is the danger of the assumption of unproved additive formulae.
>   The fallacy, of which ignorance of organic unity is a particular importance, may perhaps be mathematically represented thus:
> Suppose f(x) is the goodness of x
>   and f(y)   y
> It is then assumed that the goodness of x and y together is
>   f(x)+ f(y)
> whereas it is clearly f(x+y)
> and only in special cases will it be true that f(x+y)=f(x)+f(y).
> It is plain that it is never legitimate to assume this property in the case of any given function without proof."('Ethics in Relation to Conduct', Apostle Paper, 23 January 1904, unnumbered page)

Keynes, by referring to goodness, uses here a dualistic scheme of classification of probability: the atomistic and organicist approaches. In this way he contrasts the numerical notion of probability (with its atomicity, unproved additive assumption and ignorance of organic unity) with his non numerical notion of probability characterised by organic unity. The grounds of his criticism consists in pointing out that the fallacy is due to ignorance of the organic unity, i.e. the ignorance of organic interdependence between parts. This fallacy implies tacitly adopting – that is without proof – the hypothesis of additivity in probability and that of independence of parts from whole. In 1904, Keynes's critique to mathematical probability clearly moves from an organicist approach.

In his 1905 "Miscellanea Ethica" note, dated 6.8.1905, his scheme of classification becomes more articulated, getting nearer to his TP three-fold scheme and to my three CASES scheme. In his note, Keynes deals with what he calls Moore's speculative ethics (or 'religion' in the terms of 'My

Early Beliefs'). He discusses Moore's conception of goodness as an organic unity from a particular perspective, which is extremely relevant to my purpose of throwing light on Keynes's general early methodological attitude to probability. The note presents a general classification of the three different ways in which he considers the relation between the whole and its parts.

This scheme is relevant because is one of Keynes' few classification of primary and secondary qualities in respect of the type of relationship they have with the whole and with the parts of the whole and in respect of their measurement. It is also relevant not only for understanding the relationship between whole and parts in his probability but also his view on utility and on what will become his macroeconomics. In the scheme, Keynes uses the classification between "primary" and secondary qualities" which characterises the mechanical (that is non organic) theory of the external world, which is also present in his note dated 19.9.1905: "it is often supposed that in shape, size and motion the objects are like the sensations, and that in colour, taste, smell, soma, heat and cold they are unlike. This is the mechanical theory of the external world" ("Miscellanea Ethica", unnumbered page). The distinction between the atomic and organic theory of the external world is also present in TP (TP 276-7).

In the note Keynes classifies 'qualities' according to the type of relation which qualities have with the whole and with the parts of the whole. He distinguishes: (1) qualities which the whole has as an individual whole or as an organic unity; (2) qualities which the whole has and which also its parts have and which the whole possesses because they belong also to some or all of its parts; (3) qualities which are also additive. Keynes clarifies the characteristics which the qualities of the whole require in order to be measurable or comparable. The result of his classification is that there are qualities which are numerically measurable, others which are only rankable and others which are neither rankable nor numerically measurable because they are organic unities. This general classification of qualities is extremely relevant as it highlights - albeit indirectly – also Keynes's early approach to probability. But it is also relevant to his approach to economics. In fact, this general classification of qualities throws light on Keynes's far more fundamental attitude to the whole and the parts in relation to economics - an approach which characterizes his methodological attitude to monetary economics and macroeconomics. The relation between the whole and the parts is in fact, in economic terms, nothing but the standard macro-micro relation. Let us look at Keynes's classification of qualities:

> The clear distinction between fitness and goodness has a considerable bearing upon the doctrine of Organic Unities. 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 value taken severally.

This type of difficulty is of very frequent occurrence and is by no means confined to the moral sciences. The root of it lies in the distinction between those qualities which belong to a whole as a whole and those qualities which it possesses because they belong also to some or all of its parts. For the present purpose the following classification of qualities will be convenient:

qualities

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incapable of degree eg. existence, truth		capable of degree eg. size, utility

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1. degree of whole= sum of degrees of parts eg. weight, extension	2. degree of whole= degree of each part (each part having the quality), eg. colour, potential of an eletrical conductor	3. whole independent part, eg. Beauty, utility

Most but not all of the qualities dealt with in pure and applied mathematics and capable of exact measurement belong to class 1, but the additive property which this class usually possesses requires proof. Class 2 is of no concern in the present issue. In class 3 the principle of Organic Unities appears. The fact that utility belongs to this class leads to difficulties in the pure theory of economics. Beauty is usually admitted to have the property. Moore goes further and declares that goodness has it also; but for the completion of his theory two additional assumptions are required." (MSS,"Miscellanea Ethica", 6.8.1905)

In this note there is no explicit reference to probability. One may wonder why Keynes does not locate probability in a definite and exclusive class, as he does with beauty and utility. The latter are set by him without hesitation in class 3 among organic unities. Keynes even stresses the difficulties posed in economics by the organicness of utility. Certainly, if Keynes had explicitly referred to probability, he would have solved much controversy among his interpreters. It is important to note that also goodness is not explicitly and exclusively located by him within this three-fold scheme. In *A Treatise on Probability* a three-fold classification of goodness can be found, when Keynes considers whether goodness is additive, partially organic or an organic unity (TP: 343):

We assume that the goodness of a part is *favourably* relevant to the goodness of the whole. Without this assumption we have no reason, not even a probable one, for preferring one action to any other on the whole. If we suppose that goodness is always *organic* … such an assumption is not easily justified. The case is parallel to the question, whether physical law is organic or atomic, discussed in chapter 21, §6.
Nevertheless we can admit that goodness is partly organic and still allow ourselves to draw probable conclusions (TP: 343)

There is a methodological reason for the lack of an explicit reference to probability and of an exclusive location of it. Probability cannot be located a priori within this scheme. Its location within the threefold scheme depends on the nature of the material under investigation - that is on the nature of propositions and arguments (reasons, grounds and evidence) which back probable judgment - and nothing can be said a priori of it. The same happens for the material of economics (GT: chp. 18). Though, as wee will see, Keynes considers the material of macroeconomics and monetary economics as organic (or partly organic), there are topics, such as microeconomic arguments, which can be considered as atomic and isolable, such as 'the influence on net investment in railway rolling stock of the rate of increase in traffic' (CW XIV: 317).

In TP Keynes distinguishes between the atomic and organic natural law: "the atomic character of natural law and legal atoms (TP 276-77). Keynes concentrates on the cognitive practice of scientists, notably those who in the scientific change at the turn of the century were abandoning mechanism and necessity. What he takes into consideration are the reasons, grounds and hypotheses concerning reality, that is 'the fundamental assumption about the character of material laws', 'on which scientists appear commonly to act' (TP 276). These reasons, grounds and hypotheses are Keynes's own notion of cause as 'causa cognoscendi' or 'cause for knowledge'. According to him, the commonest hypothesis in physics is that of seeing matter as constituted by 'the collisions and arrangements of particles between which the ultimate, qualitative differences are very few'. It was shared also by Mendelian biology, which derived 'the various qualities of men from the collisions and arrangements of chromosomes' (TP 468). When he deals with the problem of natural laws, Keynes describes this hypothesis as 'what mathematicians call the principle of the superposition of small effects, or, as I prefer to call it, in this connection, the atomic character of natural laws'. He adds

> the system of the material universe [consisted] of bodies which we may term ... legal atoms, such that each of them exercises its own separate, independent, invariable effects, a change of the total state being compounded of a number of separated changes each of which is solely due to a separate portion of the preceding state. .. . Each atom can, according to this theory, be treated as a separate cause and thus not enter into different organic combinations in each of which it is regulated by different laws (TP, CW VIII, 276-7).

This hypothesis is particularly crucial to science, as it justifies causality and inferences – and among them, in particular, the application of the calculus of probability - according to which 'the occurrence of a phenomenon which has appeared as a part of a more complex phenomenon, may be some reason for expecting it to be associated on another occasion with part of the same

complex' (TP 277). If the hypothesis is not warranted and could not be applied, the inferences which were based on it are fallacious.

The evidence of Keynes's non atomistic attitude in general – sauf under specific conditions - can also be found through the analysis of the economic works he writes while revising his early versions of TP: his methodological attitude in his early economic writings. The period 1908-1921, when he revised the TP, also includes various economic writings. An examination of them clearly reveals that Keynes did not radically change his organicist (partly organicist) attitude. It is difficult to think of Keynes as an atomist, if we consider what he writes at the end of *Indian Currency and Finance* published in 1913. In describing his own general method ("my general treatment of the subject matter") he writes:

> The first affects my general treatment of the subject matter. I have tried to bring out the fact that the Indian system is an exceedingly coherent one. Every part of the system fits into some other part. It is impossible to say everything at once, and an author must need sacrifice from time to time the complexity and interdependence of fact in the interest of the clearness of his exposition. But the complexity and the coherence of the system require the constant attention of anyone who would criticize the parts. This is not a peculiarity of Indian finance. It is the characteristic of all monetary problems. The difficulty of the subject is due to it" (CW 1: 181-2)

The same attitude can be found in Keynes's famous passage in his 1924 Essay on Edgeworth when he stresses both the atomic hypothesis and that of homogeneity:

> Mathematical Psychics has not ... fulfilled its early promise. The atomic hypothesis which had worked so splendidly in physics breaks down in psychics. We are faced at every turn with the problems of organic unity, of discreteness, of discontinuity - the whole is not equal to the sum of the parts, comparison of quantity fails us, small changes produce large effects, the assumptions of a uniform and homogeneous continuum are not satisfied" (Keynes 1924 Essay on Edgeworth CW X: 262)

The methodological approach to probability has to reflect the nature of its own material, as well does the approach to economics. If the economic material is heterogeneous, organically interdependent, 'shifting' and uncertain', so should be its methodological approach. The logic of probability reflects the nature of the material of probability; similarly the logic of economics should reflect the nature of the economic material. In 1936 GT (chap. 21) passage on mathematical method and in 1938-9 passages on Tinbergen's method, the parallel between the nature of logic and that of the material is quite clear: a logical requirement which Keynes 'own method fully respects (see his method in chap. 18 of GT):

> It is a great fault of symbolic pseudo-mathematical methods of formalizing a system of economic analysis...that they expressly assume strict independence between the factors involved and lose all

their cogency and authority, if this hypothesis is disallowed ... Too large a proportion of recent 'mathematical' economics are merely conconctions, as imprecise as the initial assumptions they rest on, which allow the author to lose sight of the complexities and interdependence of the real world in a maze of pretentious and unhelpful symbols (CW VII: 297-8)

There is first of all the central question of methodology - the logic of applying the method of multiple correlation to unanalysed material, which we know to be non-homogeneous through time. If we were dealing with the action of numerically measurable, independent forces, adequately analysed so that we knew we were dealing with independent atomic factors and between them completely comprehensive, acting with fluctuating relative strength on material constant and homogeneous through time, we might be able to use the method of multiple correlation with some confidence for disentangling the laws of their action ... In fact we know that every one of these conditions is far from being satisfied by the economic material under investigation" (CW XIV:285-6, see also 306-18)

2.7 'Complex or manifold' economic magnitudes

The central concepts involved in macroeconomics are complex and the magnitudes considered by it are themselves complex. These concepts are the volume of real output/income, the volume of real net output, the stock of real capital and the general price level (CW VII: 37). Keynes defines them as 'incommensurable collections of miscellaneous objects' (CW VII: 39). In particular, 'the community's output of goods and services' is 'a non-homogeneous complex which cannot be measured' (CW VII: 38). In the GT there is another complex and heterogeneous magnitude, that is probability. Keynes considers it separately from others in chapters 5 and 12.

Complex economic magnitudes are theoretically vague concepts. Keynes refers to the well-known "element of vagueness which ... attends the concept of the general price level' (CW VII: 39). Theoretical vagueness does not mean that these concepts are also vague and ambiguous from an ordinary language point of view or in business practice. In ordinary language their meaning is easily grasped and they can be used for practical purposes. Theoretically, however, they remain 'conundrums … no solution' (CW VII: 39). They raise difficulties which are purely theoretical' in the sense that they never perplex, or indeed enter in any way into business decisions and have no relevance to the causal sequence of economic events, which are clear cut and determinate in spite of the quantitative indeterminacy of these concepts.' (CW VII: 39)

Complex economic magnitudes possess attributes which belong to different dimensional scales. They are heterogeneous and multidimensional magnitudes, inasmuch as they can move simultaneously in more than one direction and dimension. Complex objects need a complex theory. This calls for a theory of the units of quantities appropriate to them and it also means having an appropriate theory of measurement. Complex magnitudes are theoretically troublesome as far as measurement is concerned. They raise logical 'conundrums' rather than mathematical or statistical difficulties (CW VII: 39). Classical economists have committed logical errors by ignoring this problem: 'the units, in terms of which economists commonly work, are unsatisfactory' (CW VII:

37). Being non quantitative concepts (CW VII: 40) the natural quantities of real output, real net output, real capital, aggregate goods and services and the general price level do not exist. Absolute and homogeneous units of measure appropriate to these quantities do not exist either. For this reason Keynes stated that complex concepts 'cannot in themselves provide the material for a quantitative analysis' (CW VII: 39). Thus, the endeavour by classical economists 'to erect a quantitative science' (CW VII: 38) upon these concepts was a logical failure. The outcome was 'a mock precision', it tried 'to use such partly vague and non-quantitative concepts as the basis of a quantitative analysis' (CW VII: 40).

Complex economic magnitudes are irreducible since the reduction of them to more simple terms is impossible, by the introduction of tacit assumption of independence. They cannot be reduced to simple terms without falling into logical fallacies and paradoxes. The fallacy of composition is well known to economists. The reduction of one theory into another has been it a common enterprise in the history of science. In physics, various attempts have been made to reduce thermodynamics to statistical mechanics. In economics, the parallel is the theoretical reduction of macroeconomics to microeconomics. This reductionist strategy has involved the search for the micro-foundations of macroeconomics, the aggregation of microeconomics into macroeconomics and an emphasis on disaggregation. But Quine's 'thesis on the irreducibility of theories' (1931, 1960) argues that reducing one theory to another does not necessarily mean that the reducing theory explains exactly what the reduced theory explains.

A monetary macro-economy is a system characterized by complexity, possessing attributes such as organic interdependence, non-homogeneity through time and space, non numerical measurability, physical heterogeneity, openness, incompleteness, indivisibility, secondary qualities, contingency and change. Organic interdependence among variables is characterized not by external but by internal relations among the parts. Each part of a system characterized by internal relations contains in some way the whole of the system, while the latter is not just a mere sum of its parts. Developments in logic in the 1950s and 1960s demonstrated that internal relations are irreducible to external relations. Contrary to the view of logical atomists of the early twentieth century, such as Bertrand Russell, neither the logical calculus nor the analytical theory of meaning can be applied to internal relations.

Indeed, ordinary language and justified common sense do not fear the incommensurability, heterogeneity and organic (partial or total) interdependence of magnitudes. Thus, the imprecise science of economics cannot do without them. This recalls what Keynes says to his students in his lecture on 6 November 1933 about the danger of falling into scholasticism:

What degree of precision is advisable in economics? There is the danger of falling into scholasticism ... A generalisation to cover everything is impossible and impracticable. Generalising in economics is thinking by sample, not by generalisation. There is no possible use of mechanical logic, you only have it for a sample case not a general case. Even mathematical thinking is not in terms of precise concepts but "fluffy grey lumps" ... Many economists in making their definitions too precise, make them too rigid ... Another danger is that you may "precise everything away" and be left with only a comparative poverty of meaning. There is a grey, fuzzy, woolly monster of imprecision in one's head. In a complicated subject like economics the thing to do is avoid woolliness on the one hand, and scholasticism on the other ...

Even in mathematics, when it is matter of original thought, you do not always think in precise terms. The precise use of language comes at a later stage in the developments of one's thoughts. You can think accurately and effectively long before you can, so to speak photograph your thought. A not quite perfect epitome of this would be to say that when you adopt perfectly precise language, you are trying to express yourself for the benefit of those who are incapable of thought.

The reasons for being scholastic are two:

1. If you are not precise, those of your opponents who are capable of following your thought but do not choose to do so, will demonstrate that your expression rather than your thought is bad and will discredit your thought to some extent when it doesn't merit it.

2. The effort of trying to be scholastic does disclose gaps and imperfections in your thought, and thus helps to satisfy yourself that your fluffy monster [fluffy grey thoughts] is really pretty good. The value is to yourself rather than the reader"(Rymes 1989:101-2)

Complex economic material requires a complex theory. Economists should manifest a broad range of attitudes. In 1910 and in his 1924 essay on Marshall, his early point on the necessity for a mixture of logic and intuition is revived to deal with the specific material of economics.[14] Economic facts are not precisely determinable and are imperfectly known; so, reason alone is powerless without intuition:

a salient 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 (July 1910 CW XI 195)

[mathematical economics] (...) but the amalgam of logic and intuition, and the wide knowledge of facts, most of which are not precise, which is required for economic interpretation in its highest form is, quite truly, overwhelmingly difficult for those whose gift mainly consists in power to imagine and pursue to their furthest points the implications and prior conditions of comparatively simple facts which are known with a high degree of precision (1924 CW XI, 186 footnote 2)

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14 On the role of intuition in the General Theory (CW VII 249): "If we examine any actual problem along the lines of the above schematism, we shall find it more manageable; and our practical intuition (which can take account of more detailed complex of facts than can be treated on general principles) will be offered a less intractable material upon which to work". On animal spirits, see CW VII, chapter 12.

Keynes's attention to the imprecise nature of the economic material is to be seen as a reminder of the contrast placed by Aristotle in his ethics between exactness and precision. If things are indefinite, imprecise and vague, one runs the risk of being "precisely wrong". Precision is appropriate for mathematical objects, while exactness is for indefinite, not fixed things, i.e. exactness is appropriate for human action:

> Our treatment [of ethical and political matters] will be adequate, if it achieves that amount of precision that belongs to its subject matter. The same exactness must not be sought on all accounts as it is not in all products of art (Aristotle, *Nichomachean Ethics* 1094 b13)

> The noble and just things, which political science studies, exhibit much difference and fluctuation ... for it is the mark of the educated man to seek that amount of precision in each class of things which the nature of the subject matter admits: it is evidently foolish to accept probable reasoning from a mathematician and to demand demonstrations from the rhetorician (Aristotle, *Nichomachean Ethics* 1094b15-27) [15]

Aristotle's exactness stands for adequateness, appropriateness and correctness as to the situations and the objects considered; his idea is that differences in the nature of the subject matter correspond to differences in types of cognition.[16] This explains why the application of mathematical methods to social and moral sciences is problematic for Keynes. This also explains his early distrust of mathematical probability in guiding human decisions:

> As soon as mathematical probability ceases to be the merest algebra or pretends to guide our decisions, it immediately meets with problems against which its own weapons are quite powerless" (TP, CW VIII: 6)

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[15] See also: "Let this be agreed on from the start, that every statement concerning matters of practice ought to be said in outline and not with precision, as we said in the beginning that statements should be demanded in a way appropriate to the matter at hand. And matters of practice and questions of what is advantageous never stand fixed, any more than do matters of health. If the universal definition is like this, the definition concerning particulars is even more lacking in precision. For such cases do not fall under any science (techne) nor under any precept, but the agents themselves must in each case look for what suits the occasion, as is also the case in medicine and navigation" (Nichomachean Ethics 1103b34-1104a10).

Martha Nussbaum (1986 especially chapter 10 on "Non-scientific deliberation" and p. 258) points out that the demands of Platonic techne for generality, commensurability and precision were not accepted by Aristotle as to ethics.

[16] See Anagnostopoulos 1994: 55-60, 91, 269-70 and especially chap. 8 on "Variation, indefiniteness and exactness".

3. Keynes's methodology of criticism: the introduction of tacit assumptions of homogeneity and independence

There is also continuity between Keynes's methodology of criticism of mathematical probability in TP and his methodological criticism of classical economic theory in GT. In both cases it regards the *general* application of the tacit hypotheses (what Keynes calls the "philosophical premises") of the theories. Consequently both theories are not as general as they pretend to be. In both cases Keynes's discussion is on the limits of valid reasoning, the introduction of the tacit assumptions of homogeneity and independence and the nature of the material (probability and economics respectively). A truly *General Theory* is theory which does not introduce tacit assumptions.

The methodology of criticism in TP

In *A Treatise on Probability* Keynes focuses on Bernoulli's principle: "[these considerations] have only served to make explicit what was always implicit in the principle [of indifference]" (TP: 66). And,

> Probability has become associated, therefore, in the minds of theorists with those problems in which we are presented with a number of exclusive and exhaustive alternatives of equal probability; and the principles which are readily applicable in such circumstances, have been supposed, without much further enquiry, to possess general validity" (TP:22-3).

The investigation of the premises of calculus is fundamental in Keynes's approach to probability in TP. In the first Part of TP, Keynes sets himself two main tasks: to make explicit the tacit premises of calculus and to investigate the characteristics of the material of probability. These tasks cover what we have called Keynes's philosophy of probability. He maintains that the premises of probability should have precise characteristics to support calculus and that not all the material of probability reflects those characteristics. Consider the opening passage of chapter V of the 1907 version:

> The problem to be attacked in this Chapter ['The Problem of premises in probability, and the Principle of Non-Sufficient Reason'] must be, in a sense, the crux of any philosophy of probability. It is the metaphysic of the subject. Up to this point it has been assumed that knowledge concerning the probability of propositions is possible. It has been supposed that certain probabilities are known to be equal or unequal to certain others, and the argument has been concerned with the manipulation of these given quantities. The more ultimate problem of providing the material for the logical calculus has been tacitly ignored.
> There is warrant for this in the ordinary practice of logicians. The discovery of premises they leave to the metaphysicians. Their province is to manipulate given premises, and to discover what conclusions are related to these premises by way of inference. Their logical processes cannot rid themselves of a hypothetical element, or of themselves tell us

what is true. In the same way the logic of probability cannot tell us unaided what is probable (PP: 69-70; see also TP: 86)

The premises of calculus which Keynes brings to light are the direct judgements of indifference and relevance. He shows that calculus, even when applicable, always depends on these direct judgements, whose nature is intuitive (PP: 103-4). His discussion of the philosophical premises of calculus also brings to light the contrast between 'reasoning' and 'calculation', between the principles of reasoning and the rules of calculus which is a constant in his general method. In TP, his critique on the usage of the method of correlation in statistical inference follows the same approach:

> The controversial side of the method of least squares is purely logical; in the later developments there is much elaborate mathematics of whose correctness no one is in doubt. What is important to state with the utmost possible clearness is the precise assumptions on which the mathematics is based; when these assumptions have been set forth, it remains to determine their applicability in particular cases (TP:233)

This is a general attitude which he also adopts in his critique of the economic method and in his critique of Tinbergen's method in particular:

> the difficult logical problems involved in applying to economic data methods which have been worked out in connection with material of a very different character ... it leaves unanswered many questions which the economist is bound to ask before he can feel comfortable as to the conditions which the economic material has to satisfy, if the proposed method is to be properly applicable ... the next instalment should be primarily devoted to the logical problem, explaining fully and carefully the conditions which the economic material must satisfy if the application of this method to it is to be fruitful (CW XIV: 306-7)

The methodology of criticism of Classical economic theory

In his critique of the classical theory, he searches for and makes explicit its tacit hypotheses, to show that the theory is not general and has limited validity. He also points out the paradoxes, logical fallacies and contradictions in reasoning which arise when the theory do not reflect the nature and the characteristics of the material under investigation. In chp. 4 of the GT, his discussion is focused on the tacit introduction of the hypothesis of homogeneity and on the choice of units of measure (see Carabelli 1992). In chp 18 of GT, Keynes detects the logical fallacy of 'ignoratio elenchi', i.e. the fallacy of independence and composition (see Carabelli 1991). In fact, Keynes thought that the relationship between premises and conclusions in the classical theory was logically consistent (GT, Preface, CW, VII, xxi; see also 33,192). The fault of the classical theory did not lie either in the empirical unacceptability of its conclusions or in the logical inconsistency between premises and conclusions, but in its premises. The flaw in the premises lays in the fact that the latter

lacked 'clearness' (ibidem), not empirical realisticness. So, Keynes' criticism is logical. According to him, the classical theory did not make explicit - as it should have done - some assumptions upon which its conclusions stood and upon which depended the generality and the domain of validity of its arguments. These tacit assumptions were the most important, as they supported the conclusions of the classical theory. It is in this distinction that the differences between Keynes's and the classical theory's approach truly lies (GT: xxxii). Keynes writes on the role of tacit assumptions in facilitating the conclusions of the classical theory: 'granted this, all the rest follows' (CW, VII, p. 21). Tacit assumptions underlying the theory made the relationship between premises and conclusions perfectly logical:

> Thus writers in the classical tradition, overlooking the special assumption underlying their theory, have been driven inevitably to the conclusion, perfectly logical on their assumption that apparent unemployment... must be due ... to a refusal by the unemployed factors to accept a reward which corresponds to their marginal productivity (GT, CW, VII, p. 16）.

Search for Tacit Assumptions

Keynes's search for the existence of tacit assumptions in the classical theory permeated the whole of his economic writings. In 1933, in his essay 'A Monetary Theory of Production', he writes: 'One of the chief causes of confusion lies in the fact that the assumptions of the real-exchange economy have been tacit, and you will search treatises on real-exchange economics in vain for any express statement of the simplifications introduced or for the relationship of its hypothetical conclusions to the facts of the real world (CW, XIII, 410). In 1936, in the *General Theory*: 'the classical school has slipt in an illicit assumption. For there may be no method available to labour as a whole ...' (CW, VII, 13; see also p. xxv). In 1939, in the Preface to the French Edition of the *General Theory*, he re-stresses the point: 'Say was implicitly assuming that...' (CW, VII, xxxv). His criticism of Pigou, in the appendix to Chapter 19 of the *General Theory*, is also structured around the search for the existence of tacit assumptions in Pigou's theory: 'Since the tacit assumptions, which govern the application of the analysis, slip in near the outset of his argument, I will summarise his treatment up to the crucial point' (CW, VII, 272; see also 274-5 and 277).

Types of Tacit Assumptions

There are three types of tacit assumptions. The first type is the independence from changes in the value of money. Its introduction carries with it the idea of neutral money and allows the classical theoretician to pass, without any change in reasoning, from a real exchange economy to a money economy and brought with it the false analogy between the two. So, truly and consistently, by this assumption a money economy is equal to a real economy. According to Keynes, this assumption,

within the classical theory, takes different forms: neutral money, uniform purchasing power of money (as if money were a 'mean sun'), neglecting possible changes in the general purchasing power of money. As regards this type of assumption, Keynes takes Marshall's and Pigou's writings into consideration. In Marshall, the assumption is introduced in the formulation of the theory of value, as if a theory of value could ignore changes in the value of money. According to Keynes, the theory of value is to be formulated, in contrast to the classical theory's view, in money terms. See chapters 4 and 21 of the *General Theory*, especially pp. 41, 293-4. On Keynes's earlier attitudes towards money theory of value, see his essay, on 'The Economic Consequences of W. Churchill', CW IX: especially 208-9 (this point is stressed by Wells 1986: 12-14) and in A Treatise on Money, CW V: 120-124, 137,149-153. See also Rotheim 1981, Chick 1985 and Weeks 1988. Keynes notes that Marshall, in considering the theory of value, expressly stated that we may neglect possible changes in the general purchasing power of money. In particular, according to Keynes, Marshall supports Cournot's assumption of a standard of uniform purchasing power (CW XIII: 409). As regards Pigou, Keynes refers to his introduction of the tacit assumption that the supply of labour is independent of changes in the value of money (CW XIII: 409-10).

The second type of tacit assumption is the assumption of independence from changes in the value of output and employment. This hypothesis implies that the economic system is operating to its full capacity, which means an independence from the level of output or of employment. In the classical theory, its introduction allows a straightforward transfer from a reasoning based upon a full-capacity economy to a reasoning based upon a situation characterised by unemployment. In the 1939 Preface to the French Edition of the *General Theory*, Keynes suggests that the use of Say's basic assumptions, such as that demand is created by supply, means independence from the level of output:

> J.-B. Say ... [has been] abandoned by most economists; but they have not extricated themselves from his basic assumptions and particularly from his fallacy that demand is created by supply... Say was implicitly assuming that the economic system was always operating up to its full capacity, so that a new activity was always in substitution for, and never in addition to, some other activity. Nearly all subsequent economic theory has depended on, in the sense that it has required, this same assumption (CW VII: xxxv).

Lastly, the third type of tacit assumption is the assumption of independence from changes in the level of income. In the logical passage from an analysis at the individual level (either a single individual or a single industry or part) to one at community (whole or system) level, the introduction of this tacit assumption means an independence of the analysis from changes in the level of community income. So, this crucial assumption allows the mere transfer to the system as a whole of a type of reasoning which is only valid at individual level. However, according to Keynes,

when we move from individual level to community level, if the community income is not independent of the propensities of individuals to spend, this means that we cannot merely transfer the reasoning applied at the individual level to system level, without falling into logical paradoxes. What is independent at the individual level is not independent at the community level. In the actual reasoning of the classical theory, all this means that the income of the system as a whole is taken as given. Upon this is grounded Keynes's criticism that the classical saving and investment schedules could not 'shift independently of one another' and that there is interdependence between the two (CW VII: 179). Equally, supply and demand curves for loanable funds are not independent. One 'could not obtain a determinate conclusion without introducing some additional equation or datum' (CW XXIX: 228). Keynes links the interdependence of supply and demand with his theory of value (CW VII: xxii-xxiii). Surrey (1988: 110-113), suggests that at the heart of Keynes's criticism on the non-independence of classical supply and demand schedules lay a problem of systematic under-identification at the macro-level by the classical method of analysis. This is quite clearly stated by Keynes in the Preface to the French Edition of the General Theory:

> Quite legitimately we regard an individual's income as independent of what he himself consumes and invests. But this ...should not have led us to overlook the fact that the demand arising out of the consumption and investment of one individual is the source of the incomes of other individuals, so that incomes in general are not independent, quite the contrary, of the disposition of individuals to spend and invest (CW VII: xxxii-xxxiii; see also 21 and CW XIII: 278).

Characteristics of Classical Tacit Assumptions

The three types of tacit assumptions all come down to an assumption of 'logical independence from'. This means that the classical theory is valid always and for all the (or for any) levels of the variables taken into consideration, i.e. always and for all values of money, for all levels of output, for all levels of capacity, for all levels of employment, for all levels of income. All this amounts to saying that there is a characteristic common to the three classical tacit assumptions: the characteristic of universality in space and time (mid-1934 draft of chapter 6 of the General Theory, CW XIII: 427; CW VII: xxxv, 304). From this we can derive: i) that universality brought with it independence always and from all the values or levels of the variables considered; ii) that universality also presupposes the general validity of the classical premises. 'Always' and for 'all or any' levels and values of the variables means validity in general, - that is, unlimited validity. So that this common characteristic of universality of the tacit assumptions of the classical theory also represents the domain of its validity.

The Limits Set to the Classical Tacit Assumptions

If these assumptions were truly universal as the classical theory tacitly supposed, then the classical theory is unassailable. If they were not, there is a way to criticise it. Keynes maintains that, within the classical theory, its validity implicitly referred to all the levels or values of the variables considered and to any circumstances, but he does not think that this assumption of universality is true. He wants to show that the tacit conditions of the classical theory which were extremely limited in terms of validity (CW VII: 378). The General Theory is addressed to 'his fellow economists' and has as a principal object the study of 'difficult questions of theory', to the aim of 'persuading economists to re-examine critically certain of their basic assumptions' (CW VII, Preface: xxi).

In particular, the consequence of the fact that the assumptions of independence are not true always and for all the values or levels of the variables considered is that the validity of its premises is limited to some particular values or levels of the variables considered and to some particular moments in time, circumstance or context. A very strong limitation for a theory!

As regards Keynes's discussion of the limiting conditions of the assumption of independence from changes in the value of money, i.e. the classical assumption of the neutrality of money, one can recall what he writes in 'A Monetary Theory of Production' 1933):

> We are not told what conditions have to be fulfilled if money is to be neutral. Nor is it easy to supply the gap. Now the conditions required for the 'neutrality' of money, ... are ... precisely the same as those which will insure that crises do not occur. If this is true, the real exchange economics ... is a singularly blunt weapon for dealing with the problem of booms and depressions. For it has assumed away the very matter under investigation (CW XIII: 410-11).

And, as regards the level of output, Keynes in the mid-1934 draft of chapter 6 of the General Theory shows that the assumptions of the classical theory refer not to all levels but to only one level of the variable:

> Its significance [of the then purely negative innovation of Keynes's theory] ...will depend on our establishing our contention that there is, in general, only one level of output at which equality holds between marginal prime cost and the anticipated price, so that under competition the aim of maximising profit will cause entrepreneurs to chose that level of employment for which this equality holds. Only if the equality held good, as the classical theory assumes, for all levels of output, would it be true that there is nothing to check the increase of employment (CW XIII: 427) (my italics).

So, the 'lack of clearness in the premises' means a lack in their generality and consequently in the conclusions of the classical theory (CW VII: xxi). It means that there are premises or assumptions which are implicit in the classical arguments which - having limits of generality and of validity - also set limits to the classical conclusions, therefore limiting the generality of that theory. Actually, their limited generality and validity reduce the classical theory to a specific case of a more

general theory. A very similar criticism based on the tacit introduction of assumptions of independence has already been raised by Keynes against the quantity theory of money in A Tract on Monetary Reform (1923):

> the [quantity] theory has often been expounded on the further assumption that a mere change in the quantity of the currency cannot affect k, r, and k' - that is to say, in mathematical parlance, that n is an independent variable in relation to these quantities. It would follow from this that an arbitrary doubling of n, since this in itself is assumed not to affect k, r, and k', must have the effect of raising p to double what it would have been otherwise... Now 'in the long run' this is probably true ... But this long run is a misleading guide to current affairs. In the long run we are all dead ... In actual experience, a change of n is liable to have a reaction both on k and k' and on r (CW IV: 65).

Similar are his criticisms on the theory of purchasing power parity ('the theory requires a further assumption for its validity') and on the presumed intrinsic stability of the value of gold ('The independent variety of the influences determining the value of gold has been in itself a steadying influence ... The value of gold is no longer the resultant of the chance gifts of nature and the judgement of numerous authorities and individuals acting independently') (CW IV: 75, 133-4). In *A Treatise on Money* (1930), the point is re-stressed again: 'the purpose of isolating 'changes on the side of money''; 'subject to 'independent' influences'; 'the non-independence of relative price changes' (CW V: 73, 75, 77).

What Keynes Meant by a 'General Theory'

Now we can also grasp the true meaning of the word 'general' which baffles the reader of the *General Theory* as soon as he reads its title. In chapter 1 of the General Theory, Keynes writes: 'I have called this book the *General Theory of Employment, Interest and Money* placing the emphasis on the prefix *general*. The object of such a title is to contrast the character of my arguments and conclusions with those of the classical theory (CW VII: 3).

A general theory is for Keynes a theory which does not tacitly introduce hypotheses of 'independence from'. A general theory in this sense - in contrast with the presuppositions of the classical theory - does not mean that it is also universal in time and space. For Keynes, economic theory is a 'logic, a way of thinking'', a 'method' (CW XIV: 296; XII: 856) and, in particular, it is, as we have seen, a contingent form of non-demonstrative reasoning. Thus, a theory is general if it could cope with different hypothetical cases, characterised by different levels of dependence among the variables and allows change and variability to play a central role in it. But the choice of the abstraction level of the theory and therefore of the specific model among the possible ones applicable to practice is not universal but is relative to time and space circumstances. The ability to choose the specific model is described by Keynes as 'an art' (CW XIV: 296). Obviously, the

conclusions of the different models vary according to circumstance. So, his use of the word 'general' is truly connected with his methodological criticism of the classical theory. In it lies the contrast between the 'character' of Keynes's argument and that of the classical theory (CW VII: 3; see also 276). A theory, which at the beginning of its analysis avoids introducing limiting assumptions of independence, is truly general. Theories - like the classical theory - which do not, are simply special cases of the former: 'We are thus led to a more general theory, which includes the classical theory with which we are familiar, as a special case' (CW VII: xxii-xxiii; see also XIII: 420).

The Logical Flaw in the Classical Theory: 'Ignoratio Elenchi'

To understand the contrast between a general theory and one of its cases, we must investigate the nature of the logical flaw in the classical theory point out that the mistake Keynes attributes to the introduction of the tacit assumptions by the classical theory is one of the standard mistakes described in classical logic. Keynes refers to it as 'ignoratio elenchi' (CW VII: 259). Ignoratio elenchi is one of the thirteen types of fallacy of argument listed by Aristotle in *Sophistical Refutations* (1908 ed. by W.D. Ross: 167a 20). The Latin title from the original Greek is *De Sophisticis Elenchis*). In this work Aristotle explicitly takes up the question of contentious reasoning. On this type of fallacy, see Hamblin 1970: 31-32, 87-88.

This brings the logical reasoning of the classical theory to a 'false inference', a 'fallacy of composition', an 'optical illusion, which makes two essentially different activities appear to be the same', a 'false analogy', a 'paradox' - that is the transfer, without changes, of an analysis applied to one part of a system to the system as a whole (CW XIII: 278; CW VII: xxxii, 20-21). In *A Treatise on Probability* Keynes refers to it as 'fallacy of independence' (CW VIII: 191). Or, what is the same thing, to the mistaken 'idea that it is comparatively easy to adapt the hypothetical conclusions of a real wage economics to the real world of monetary economics' (CW XIII: 410; see also 278).

In particular, the mistake attributed to the classical theorists is to ignore the dependence of the system as a whole on changes in the variables considered (or to ignore - what, as we will see, is the same thing - the relevance for the system as a whole of the changes in the variables). In logic, ignoratio elenchi is considered an informal fallacy of relevance. An informal fallacy is an error in reasoning not depending on the form of the argument but on its content. In particular, an informal fallacy of relevance occurs when the premises of an argument are irrelevant to and incapable of establishing the truth of the conclusion of an argument. Relevance implies that there should be some connection between the meanings of the premises and the conclusion of an argument. See Greenstein 1978: 112,132,141 and Hamblin 1970: 31-2. On Keynes's stress on the connection between relevance and meaning, see TP, CW VIII: 62)

The epistemological role of Classical tacit assumptions

It is clear at this point that the nature of the criticism which Keynes makes of the premises of the classical theory is not concerned with their empirical relevance. It is truly a criticism of logical relevance. Thus, Keynes's criticism (even considering his remarks on classical hypotheses as 'inappropriate to facts' CW VII: 371) is not that the premises of the classical theory are either unrealistic or empirically irrelevant, but that they are not general ('lack ...of generality in the premises', CW VII: xxi), i.e. that they are logically irrelevant and inadequate to the questions raised.

As seen above, Keynes deals with direct judgements of logical relevance in A Treatise on Probability, in his discussion of Bernoulli's principle of indifference (CW VIII: 58-60, 62, 113). Keynes there distinguishes between judgements of preference or indifference and judgements of relevance or irrelevance. The first concern situations in which the evidence is the same, but the conclusions are different; while the second concern situations in which the evidence is different, but the conclusion is the same. Direct judgements of logical relevance concern, in particular, the effect that the probabilities of an argument are affected (or not) by the inclusion in the evidence of certain particular details. The effects of different amounts of relevant evidence (or of relevant knowledge as he also called it) are further discussed by him in dealing with the concept of the 'weight of argument' (CW VIII: 77-85).

Judgements of logical relevance are for Keynes not absolute, but relative to the quaesitum and to the particular circumstances in which the latter is raised: in particular they are relative to 'some only of the known characteristics of the quaesitum, those characteristics ... which are relevant in the circumstances' (TP, CW VIII: 113; on relevance as adequacy and perspicuousness, see also Putnam 1981: 201-3). This notion is re-used by Keynes in The General Theory, in his choice of independent variables. The relativity is again re-stressed: 'in this place and context ... so little relevant ... on our quaesitum' (CW VII: 245, 247). Let us recall that his 'object' of analysis is to discover what determined the level of output. Logical relevant factors are those which change fast and suddenly or those which could be managed: for example, the rate of interest is judged by him as an independent variable (CW XXIX: 115).

Finally, Keynes' methodological criticism cannot be interpreted within the terms of the old and new polemics on the realism or instrumentalism of hypotheses of a theory or of one of its models (see Boland 1989: chp 4 and the bibliography there listed, but see also Morgenbesser 1969, Nagel 1963; Mongin 1988 and the following discussion in Philosophy of Social Science 1988). Verification, confirmation, corroboration, falsification or just mere success in forecasting facts, did not play any role in Keynes's criticism of the classical theory's premises. O'Donnell's (1989: 228-9)

and Lawson's (1987 and 1989) stress on Keynes's empirical realism of hypotheses in contrast to instrumentalism seems misplaced. This type of controversy is internal, within positivism. In brief, in the case of economics it is a controversy between Friedman and Samuelson. Keynes is already outside its terms. Further, as far as Lawson's two contributions are concerned, the author seems to mix two notions of realism (Platonic metaphysical realism and empirical realism) which I think cannot so easily blended.

We have seen that the three tacit assumptions all come down to the introduction of an assumption of 'logical independence from'. Now, in Keynes's specific case, 'logical relevance or irrelevance' and 'logical dependence or independence' are exactly equal concepts: they play a central role in Keynes's epistemology, in particular as to the notions of causality and the role of the 'atomic hypothesis' and of independence. In A Treatise on Probability, a judgement of independence ('independence for knowledge') is for Keynes a judgement of logical irrelevance. In A Treatise on Probability, Keynes decides to define independence by reference to the concept of logical relevance rather than to the concept of causality. The problem of the relation between logical relevance and empirical relevance - or 'material cause' as he also called it -, is left by him unsolved (CW VIII: 182-3).

Keynes is not interested in material ontology, i.e. how things are in reality, but in how things are actually known (or, rather, probably known) by us. The distinction he made is between 'causa essendi' ('the cause why a thing is what it is') and 'causa cognoscendi' ('the cause of our knowledge of the event') (TP, CW VIII, Note on the Use of the Term 'Cause': 305-8. In this I disagree with Lawson's reading of Keynes as a 'realist', attempting 'to understand causal things and the ways in which they act' and 'to analyse causal structures at their own level of being' (Lawson 1989: 239). Keynes considered cause a relative cognitive concept, i.e. a logical ground or a reason for believing which is relative to particular circumstances (see the reference to 'causal analysis' as 'strictly logical' in 1933 draft of The General Theory, CW XXIX: 73). The concept of relevance is therefore connected by him with knowledge (probable knowledge) of or about things rather than with things in themselves. To clarify this point, see the following quotation from A Treatise on Probability: 'this conclusion cannot be reached unless a priori ... we have some reason for thinking [i.e. causa cognoscendi] that there may be such a causal connection between the quantities [i.e. causa essendi]'(CW VIII: 466). Relevance is connected with the first type of cause (i.e. causa cognoscendi), not with the second (i.e. causa essendi). On the connection between irrelevance and independence and on their role in Keynes's concept of causa cognoscendi, see Carabelli 1985: 154, 157; 1988: sections 3.5, 3.6. and 6.1). The judgement of independence is at the basis of the

acceptance by mathematical probability theory of a specific hypothesis on the atomic nature of the variables considered (CW VIII: 276-78; see also Carabelli 1988: chapter 6).

In the classical economic theory, the assumption of independence from', first means logical 'irrelevance' (of changes in the value of money, in the level of output, in the level of income). A direct consequence of this irrelevance is, as seen, the implicit generality of the premises: always and for all levels or values of the variables. But it also means - in a way very similar to that of the mathematical theory of probability, - the implicit introduction of the 'atomic hypothesis', with all its quantitative and measurable attributes (numerical measurability, divisibility, time-reversibility, homogeneity, exhaustivity, completeness, permanent forces, primary qualities).

In the classical theory the tacit hypothesis of 'independence from' not only plays the same epistemological role as the 'atomic hypothesis' in the mathematical theory of probability, but it also has a similar role to that played by the axiom of parallels in Euclidean geometry: 'It is, then, the assumption ... which is to be regarded as the classical theory's "axiom of parallels"'. Once this assumption is introduced - in a way very similar to that of the introduction of the axiom of parallels in Euclidean geometry - a series of conclusions emerges automatically (i.e. thanks merely to the introduction of that assumption): 'granted this, - writes Keynes - all the rest follows' (CW VII: 21; see also 16).

 The introduction of the hypothesis of independence by the classical theory allows it to deal with complex systems as if they were always isolable from all the levels or values of the variables considered. In introducing this assumption, the classical theory is really trying to isolate the economic system from changes in some variables, that is to abstract from variability - a condition which Keynes thinks inapplicable to systems such as those which economics deals (or should deal) with (CW VII: xxxii; see also CW V: 77).

In other words, this means that the classical theory's assumption of independence is equal to an ungrounded assumption of isolability: an assumption which is very similar to one introduced in classical Newtonian physics. Thanks to this, the classical theory can speak of an economic individual in isolation, of an industry in isolation, of an economic system in isolation. The stress, obviously, goes on the term 'in isolation'. In fact, economic individuals, industries and systems in isolation all behave similarly. It should be stressed that even isolable systems behave as if they were individuals or parts of systems. They are in fact systems in which some assumptions of independence allow their separation from changes in some other variables judged irrelevant. They are simple or closed systems in which the functional relationships among the variables are atomic in character and they are independent from other systems.

In contrast to these simple systems stand non-isolable systems. These are truly complex or open systems. Given the general impossibility of separating them from changes in some other variables, in these the functional relationships among the variables are organic in character. 'Non-independence from' means that there is an organic interrelation among the variables under consideration. It is in the latter systems that Keynes is mainly interested. We can now grasp that a general theory is for Keynes truly a 'complex' theory: a theory where the non-independence from the variables considered meant that there is organic interdependence among them. We can now also fully grasp Keynes's methodological criticism of Pigou. According to Keynes, Pigou is taking 'out of a complex system' two variables (employment and real wages) which were 'not' logically 'independent' (CW XIII: 312-3).

In the 1933 draft chapter of The General Theory Keynes equally stresses that both employment and real wage rates are functions of the level of effective demand - in particular there exists an inverse relation not to be confused (according to Asimakopulos 1988: 79) with a demand curve for labour: 'we may well discover empirically a correlation between employment and real wages. But this will occur, not because the one causes the other, but because are both consequences of the same cause' (CW XXIX: 100). On this see also Brothwell 1988: 54.

We can therefore conclude that the main standpoint for Keynes's methodology of criticism of the classical theory is provided by the concept of organic interdependence, - a concept which is at the base of his own positive approach to economics (his notion of 'macro' comes from here) and stems directly from his approach to probability and his criticism of classical probability. On the notion of organic interdependence, see TP, CW VIII: 276-78. Attention has been paid by various authors to the centrality of this concept within Keynes's economic approach - albeit drawing different interpretations of its role. See Brown-Collier 1985, Brown-Collier and Bausor 1988, Davis 1988 and 1989, Fitzgibbons 1988, Lawson 1989, O'Donnell 1982 and 1989, Winslow 1986 and 1989, Carabelli 1985 and 1988. Grunberg 1966 and 1978 is an early contribution which points out the notion of open and complex systems in economics. However he does not refer to Keynes.

Certainly such a complex and open economic theory dominated by organic interdependence is very difficult for a theorist to cope with; suffice to consider the problems raised by the language used by Keynes in the General Theory. Keynes thinks that in economics coping with complexity could be done only by using ordinary language (which is an open language) rather than by artificial closed languages like mathematics (CW VII 297). On this aspect, see Carabelli 1985 and 1988 pp. 141-4, 152-7. See also Walker (1985 p. 176), who disagrees with Keynes's idea that mathematics is linked to the atomistic hypothesis and is unable to deal with problems of organic unity.

4. Uncertainty as Greek tragedy's legacy: uncertainty as tragic choice

In section 1. we have seen that Keynes' uncertainty can be characterised by three situations:

- *IGNORANCE* when there are no reasons, not even some partial reasons. In this case, there is no probability and no reasonableness. The situation is of total ignorance; if a probability exists, it is unknown due to our want of reasoning power or cognitive skill;
- *LOW WEIGHT* when there is very low weight of argument. The total amount of available knowledge is very limited; so there is very low weight in probable belief (low intensity of belief), very low confidence in reasonable belief. Reasonable beliefs are not firm, they are unstable and prone to volatility; they easily changes if a new piece of relevant information or knowledge becomes available;
- *INCOMMENSURABILITY* probabilities exist but are non comparable and incommensurable

The third case is the situation I am dealing with in this paper. The non comparability and incommensurability of probability is intrinsic, due to the nature of the material of probability. The material of probability is, in general - sauf in specific cases- , non homogeneous as reason, ground or evidence is heterogeneous and incommensurable. There is no possibility to reduce this heterogeneity of the material of probability by using a common or homogeneous unit of measure as no common unit of quantities of probability exists; there is also no possibility of introducing tacit assumptions of atomicity and independence. In this section, I will deal with uncertainty as an incommensurable magnitude from a new perspective.

If reasons are heterogeneous and compelling, irreducible and unsolvable conflicts arise among them; the resolution of these conflicts is impossible. In these situations, making a decision is not a question of reasonableness: it is a rational dilemma. In my view, Keynes's uncertainty characterises situations of rational dilemma. When uncertainty rules, indecision, vacillation of judgement and cognitive instability result. In my 1998 article "Keynes on probability, uncertainty and tragic choices" (Carabelli 1998) I have suggested that, in Keynes, the third case above of uncertainty, as non comparable and incommensurable probabilities is somehow loosely connected with Greek tragedy and I have shown how tragedy influenced Keynes from the very beginning of his intellectual career.

Right from the beginning (that is in the period 1904-6) Keynes is interested in moral dilemmas and irreducible conflicts which are typical of ancient Greek tragedy and classical drama. In my 1998 article I have examined the evidence of the early influences of tragedy upon Keynes and the main themes of tragedy in which he is interested: in particular the theme of noble hero and the situations of moral and rational conflicts and dilemmas; I have also examined his tragic view of ethics and aesthetics. Keynes's constant attention to the non-comparability and incommensurability

of magnitudes (probability and economic magnitudes such as aggregate utility, the general level of prices, real capital and aggregate real income) derives from his early interest in dilemmas and in particular his concept of uncertainty as incommensurability is to be linked with tragic *rational* dilemmas and choices. Dilemmas characterise situations of indecision, of irreducible conflict where moral compelling claims or reasons (*some* claims or reasons to be precise) cannot be weighed down one against the other on a common scale or by using a common and homogeneous unit of measure. These situations are the domain of radical uncertainty, a concept which is relevant to Keynes' thought in general but which will become dominant in his mature economic writings and in the *General Theory* in particular.

Tragedy: the main themes

Tragedy plays a central role in Greek poetry. The common features of tragedy are well known. Most tragedies concentrated greatly on the theme of aristocratic suffering. Aeschylus' motto is that "we learn by suffering". The suffering of noble hero is more affecting to watch than the misery of lesser mortals because the extent of their fall is so much greater: "the greatest of kings and the unhappiest of mankind" (Hindson and Gray 1988 p. 156).

History is a story of the fragility of human civilisation. Tragedy considers the inevitable downfall of human pride, the humiliation from the peak of human greatness. Anxiety and fear are also important in the tragic outlook which puts man constantly in a dilemma as to the necessary course of human action. Indecision and vacillation of judgement are a common human condition.

By offering a complex experience and demanding a complex response, the Greek theatre - tragedy and drama in particular - is uniquely placed to voice more relative ways of thinking and feeling. By conveying the complexity of human life and experience, tragic theatre and drama help men take decisions and face dilemmas, helping men in the process of forming their decisions in situations of tragic choices, what we would now call radical uncertainty in economics.

In my 1988 article I have concentrated on just a few of these features of tragedy, those relevant to Keynes: the myth of the tragic noble hero; the existence of a plurality of heterogeneous moral claims; the problem of conflict between opposite moral claims; tragic moral dilemmas due to incommensurability and non-comparability of conflicting moral claims (see Carabelli 1988).

Tragic moral dilemmas

What is a tragic moral dilemma? For there to be a moral dilemma, there must be a situation in which a plurality of moral ends and values exist; where ends and values are heterogeneous.17

Plurality of values implies that they may eventually clash or may be in conflict among themselves. Conflicts originate because there is no common unit of measure or a common scale on which to weigh the opposite claims Conflicting claims may generate dilemmas in choice. Plurality of values means that what is good necessarily lies in a large number of incompatible directions and it is intrinsically impossible that all of them should be followed through into realisations. For example, one cannot achieve pure simplicity and variegated richness in the same thing or on the same occasion. It is impossible to reduce them to a common unit or to weigh them on a common scale or against some standard of measure. Yet both make claims upon us and conflict arises. In practice we often sacrifice one good to another or we make compromises and accommodations. In tragic situations, however, we cannot easily sacrifice one good for another or override the claims of certain values (incompatible claims). Both make a claim upon us and we have to choose anyway. We feel guilty and we regret the choice. Tragic conflict is irreducible and non solvable.

Tragedy represents the typical situation of moral conflict in which whatever one does something will be to regretted. The most well known case of moral dilemma is Agamemnon's dilemma in Greek tragedy, Aeschylus's Oresteia. Agamennon has to decide whether to save his daughter Iphigenia or to save his kingdom. He has to choose between violating his duty as a parent and violating his duty as the leader of a military expedition. The conflicting claims are: family love and love of one's country. Agamemnon's situation is indeed morally tragic: each of these duties urges with undiminished force despite the existence and applicability of the other. That is, neither duty overrides the other thus making it right not to fulfil the other; rather, both have their full force as duties. For that reason Agamemnon must incur guilt whatever he decides to do. Each of the conflicting obligations, duties or claims has a moral force of its own.[18]

Keynes's ethics of virtues

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17 On the plurality and incommensurability of moral considerations and on the complex whole of disparate and incommensurable elements see Stocker 1990 (especially chp. 5 "Plurality and choice" and chp.8 "Monism, pluralism and conflict").

18 Literature on moral dilemmas is growing (Gowans 1987; Sinnot-Amstrong 1988). A persuasive example of modern tragic dilemma is Sophie's choice from William Styron's 1979 book by that name: the choice between saving her son and saving her daughter from extermination by the Nazi (in order to save one child she must offer the other for extermination, and if she does nothing, both will be taken). Sophia's choice has been also revived in a well known 1982 American film, directed by Alan J. Pakula with Merryl Streep. In a famous scene Sophie tells Stingo (her lover) her secret that is her tragic choice. She recounts the night she arrived at Auschwitz concentration camp with her children, and of how a Nazi officer forced her to choose life for one child, and death for the other. She pleas 'Don't make me choose. I can't choose'. When the Nazi tells to take both children away, she releases her daughter, shouting "Take my little girl!" Sophie watches the little girl who is carried away to die. She feels guilt and despair.

In ethics, Keynes distinguishes between "speculative ethics" and "practical ethics" (or "morals"). "Speculative ethics" concerns ultimate ends and values which are intrinsically good: what in his 1938 paper *My Early Beliefs* he called his "religion", a religion which he got from Moore. And in line with Moore, Keynes includes love, friendship, beauty, truth and knowledge among these ultimate intrinsic values. But, in his *Miscellanea Ethica* of 31 July 1905, Keynes also explicitly includes tragedy among these values: 'Speculative ethics ...The nature of beauty and tragedy and love and the attitude a man should have towards truth would prove of interest in the discussion' (Keynes MSS, *Miscellanea Ethica,* 31 July 1905)

In his undated paper *On the principle of organic unity* (but read again on 22.1.1921), Keynes maintains that noble and heroic states of mind may be associated with tragedy and in particular with tragic states of affairs. Here Keynes criticises Moore for having considered "good" states of mind in isolation. In his view, on the contrary, one should also consider the states of affairs associated with those states of mind. In this paper, he again explicitly includes tragedy among the attributes of the states of affairs to be desirable ("beauty, harmony, justice, *tragedy*, virtue, consistency, truth"). Heroic and noble states of mind and feelings may be associated with tragic, bad or unjust states of affairs. Consequently, before judging a situation as good, the situation should be analysed as a whole. States of mind and states of affairs are organically interconnected. They are relational goods: to show pity, there must be something to be pitied. This is the reason why even a good life may be associated with dilemmas and disasters. In his paper, Keynes describes the attributes of these tragic states of affairs:

> The attributes which belong to states of affairs and not, in every case, to states of mind in isolation are those which are suggested by the words - Beauty, harmony, Justice, tragedy, Virtue, Consistency, truth - or by their opposite....In a similar way, a state of affairs may be tragic and, therefore, not to be desired, although the feelings of the actors in it may be all noble and heroic. But I am not certain that all tragic states of affairs are bad on the whole, when everything has been taken into account, or that the goodness of the states of mind, if it is very great, may not outweigh the badness of the state of affairs, - because in our final judgement we must take into account both the states of mind and the state of affairs. It is possible, I think, to imagine two states of affairs, one of which is tragic or unjust and the other not, such that the states of mind in each are of exactly equal value, and to believe that the tragic state of affairs is less desirable than the other. (Keynes MSS *On the principle of organic unity,* undated but read again on 22.1.1921, p.5-6).

In considering virtue and the virtuous man, Keynes similarly believes that one should not consider single acts or single virtuous actions, but a "complex" or "an organic unity". Similarly to ancient Greek ethics - again with Aristotle in particular - he thought one should consider the whole life, the whole conduct and character of man:

> The complex to which the attribute of virtue can be given is of a different kind. Only persons can be virtuous. But it is not on account of single states of consciousness that they are virtuous. It is an attribute of their conduct as a whole, of the organic unity composed of their successive states of

consciousness (...) It is, in fact, to these things rather than to states of mind regarded in isolation that our emotions of approval and disapproval instinctively refer. I do not think that these feelings would be as direct as they appear to be, if they were based in reality on a calculation of the effects on states of mind of the states of affairs in question, and were only hated in the way in which we hate the rain that wets us (*On the principle of organic unity*, undated, but read again 22.1.1921, p.8)

In contrast to modern ethics, Keynes's ethics takes as its main subject matter not simply a narrow domain of specifically moral duties and obligations, but the whole conduct of human life. Its starting point is the question, "How should one live?" So, it is not single acts that are important but a whole life. Not only the agent's acts, but also the whole texture of the character from which the acts flow, asking about motives and intentions, as does Kantian ethics, but asking, as well, about reactive feelings and emotions - insisting that an action is not really virtuous unless it is chosen without painful and tragic struggle, and manifests a stable disposition to choose actions of this sort. The whole of character is taken to be available for ethical cultivation; and human goodness requires not just obeying certain external rules, but also forming choice, desire, passion, and attention, in a comprehensive and exacting way over the course of an entire life which may comprehend tragic situations.

In contrast to Moore, Keynes thought that not only states of mind but also some states of affairs may have intrinsic value. For him, goodness is different from usefulness; thus, some states of affairs can be judged in their intrinsic value, i.e. totally apart from their influences on experience. This again raises the problem of evaluating tragic states as a whole:

If a good state of affairs is only useful, it is useful in the way that a poem or a picture is, not in the way that a pen or a brush is useful; and we can judge its value absolutely, apart from its actual usefulness, just as we can judge absolutely the value of a poem or a picture. But I think that I go further than this and hold that the intrinsic value is ethical. Some state of affairs ought to exist rather than others apart from their influence on experience (*On the principle of organic unity*, undated, but read again 22.1.1921)

Pluralism and heterogeneity of ends and values

Keynes believes in the existence of a plurality of heterogeneous ends and values in ethics. As we will see, this is also true for his view on aesthetics. He sees "many different kinds of beauty as of virtue" (Keynes MSS *On Beauty and Art*, undated, p.5).

The end has a plurality of parts, each qualitatively distinct from every other, and each essential to the fullness or completeness of the life. This means that it is inappropriate to conceive the job of choice in a utilitarian or consequentialist way, as that of maximising the quantity of some *single* end or good; and quite unreasonable to think that one may advance toward the good by trading in one end-component for another. Each and every one is necessary and they are not commensurable or comparable one with another. This is at the root not only of the difficulties of the

intra-subjective comparison of values stressed by Keynes but also of the *inter*-personal comparison of values, that is the comparison between different subjects' values. Difficulties as to compare the magnitude of one man's virtues with that of another man's talents are equally stressed by Keynes:

> For granting... that there is a sense in which probability is capable of more or less, is it the case that *all* probabilities are comparable with one another in respect of magnitude? I think I can show that it is as impossible strictly to compare the magnitude of the probabilities of some pairs of statements, each relative to given evidence, as to compare the magnitude of one man's virtue with that of another man's talent." (Keynes MSS, TP/D/7.2, *Draft of the chapter on the measurement of probability*).

Irreducibility of heterogeneous plural ends and values: Keynes's pleasure, goodness and happiness.

In his 1905 paper on 'Virtue and Happiness', Keynes identifies three ultimate ends of life: pleasure, goodness and happiness. Firstly, he distinguishes pleasure from goodness; secondly, goodness from happiness (MSS *Virtue and Happiness* p.10-11). In his view, it is often difficult to distinguish between pleasure and goodness in human actual experience. But the two ends are quite different. This position is in line with Moore's. He then distinguishes happiness from goodness and pleasure.

To clarify his conception of happiness Keynes refers to Plato's *Dialogues*, especially the *Symposium*. The then current interpretation of it appears to him unsatisfactory, or better, "cause of complete delusion". Keynes criticises the praise of Platonic love and abstinence. Keynes's own conception of happiness is based in particular on a re-interpretation of the passage of Plato's Symposium (203 b, c, d) on the birth of Love by Poros and Penia. In his view, Love who takes on both the father's and mother's characteristics, lies in a middle position between good and pleasure and between wisdom and ignorance. In this middle position lies Keynes's notion of happiness (Keynes MSS, Virtue and Happiness pp. 6-7)

Keynes denies that happiness is reducible to pleasure. While pleasure implies the absence of pain, happiness does not. Happiness can exist together with pain and also "with depression" (p.8). Happiness is a synthesis, a composition (not a sum) of heterogeneous values, desires and virtues. Firstly, it is a mixture of body pleasure and goodness. Secondly, happiness may coexist with pain.

Keynes's concept of happiness is not a uni-dimensional or uni-scalar attribute of man's states of mind. His happiness is the result of the composition of the tendencies of our desires, where desires are considered by him heterogeneous and incommensurable. This is why, different desires may give rise to moral conflicts and eventually to the weakness of the will (akrasia). It is also associated with virtue: 'a virtuous man is a happy man. His desires are balanced with his possibilities' (ibidem p.12). This means that his happiness is also "contentment": a satisfaction with one's environment; a state beyond disappointment:

Some of these overlap with happiness; just as good and pleasure can overlap. States can exist which are both pleasurable and happy; not only, however, can happiness coexist with pain but even, I think, with depression. In the ordinary use afterward, if we eliminate those occasions in which it is not at all to be distinguished from pleasure, its most obvious equivalent seems to be contentment. An almost perpetual temperamental satisfaction with one's environment - the cat-on the-matting attitude - is known as happiness (MSS Virtue and Happiness)

This notion of happiness as contentment seems to rule Utopian ideals and desires out of Keynes's realm of practical possibilities. Should we desire more than we can actually attain? In his early writings, Keynes answers positively while, for example, Burke - in his view - answers negatively. In fact, Burke held that 'all virtue which is impracticable is spurious'. In his early essay on Burke, Keynes disagreed with Burke precisely on the fact that without ideals we have nothing to aim for. Thus, for Keynes, disappointment may, in general, be better than contentment. But it should be noted that Keynes's justification of pursuing happiness, 'the truly good', is only in terms of probability ("more likely"). This is in line with his whole methodological approach:

But it is, surely, sufficiently obvious that it may be sometimes right to desire something more supreme than one can ever get, and to hate and despise the environment, if be bad. Disappointment may be better than contentment. But if the preacher of contentment were to be cross-questioned, it might be found that he only meant that he who pursues the truly good is more likely than another to find satisfaction in attainment. Perhaps. (MSS, *Virtue and Happiness* p. 12)

Many are the authors who may have influenced Keynes on the theme of the plurality and irreducibility of ends and values. First of all, Aristotle. On the plurality and variety of goodness, Keynes follows Aristotle rather than Plato. Keynes echoes Aristotle's criticism of Plato based on the heterogeneity of plural ethical values and on their non-commensurability in *Nichomachean Ethics,* which we know Keynes read in 1906. Plato held that the hallmark of rational choice is the measurement of all alternatives by a single quantitative standard or metric. This is done by supposing a qualitative homogeneity of all the values, that is the Platonic notion of the Single Good. Platonic tradition - as does utilitarianism - accepts the idea of a uniqueness of ends and values: it reduces goodness to one dimension alone. Aristotle, on the contrary, stresses the plurality and variety of goodness and the fact that good is not reducible to a univocal scale. Aristotle held that Platonic approach renders intractable the problem of choice among heterogeneous alternatives and neglects the qualitative heterogeneity of plural values (for example, beauty and goodness) (see Nussbaum 1984, 1986a, 1986b). Keynes, like Aristotle, disagrees with Platonic tradition but it should be noted, however, that in his mature dialogues Plato himself criticises his early position. Thus, we could say, more precisely, that Keynes's position on pluralism in ethics is in line with Plato's *mature* dialogues and with Aristotle's ethical writings.

The second author is Moore himself. In his *Principia Ethica*, Moore too recognised the plurality of values (Moore 1903, sects 47-8). Thus Keynes's disagreement with Moore does not concern the existence of a plurality of values or claims but his method of solution of the possible conflict between them.[19] In Keynes's view, in the end Moore reduces goodness to one dimension alone, by denying pleasure any role: goodness without lust and body pleasures. Keynes criticises him for having reduced love to Platonic love only and having praised Plato's abstinence. In contrast, Keynes's notion of happiness, as seen, is a mixture of goodness and pleasure-lust and may also be associated with pain and depression. This may explain Keynes's early choice of a life of action versus Moore's choice of a life of contemplation. In his view, Moore's method of reducing the plurality of ends and values also implied reducing the numbers of virtues to private virtues only and the activities of life to contemplation only. In his 1938 My Early Beliefs, Keynes noted that Moore reached neither Plato's Republic nor the Laws, thus implicitly stressing the difference between Plato's early and mature Dialogues.[20] Plato's mature dialogues, as we know, are closer to Aristotle's interest in the multi-dimensional character of goodness and in the possible conflict between individual and public values. In contrast with his early dialogues, in the Republic and in the Laws Plato presses for intervention by philosophers in public life to change the "politeia". He wants the philosopher not to limit himself to moulding his own character but to become a demiurge of wisdom, justice and of all public virtues towards other men (Republic 500 d 6). He urges intervention in public life to modify men and their way of organising themselves. In his mature dialogues, Plato also wishes for tranquillity and quietness (hesychia) (Republic 496 d 6): a concept which seems close to Keynes's happiness in the sense of "contentment".

Another author who may have influenced Keynes on the plurality of ends and values is Franz Brentano. During the Long Vacation 1905, Keynes read Brentano's The Origins of our Knowledge of Right and Wrong (precisely on 6 July 1905). At para.32 of his book, Brentano deals with the plurality and mutual irreducibility of goodness. Finally, Keynes may have been influenced by his

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19 The existence of a contrast between Keynes and Moore on ethics (which adds to their contrast on probability) already in 1905 is shown by a comment that Moore wrote to Russell on 23 October 1905 while discussing a paper on ethics by the latter. Moore's comment concerning Keynes's own interpretation of ethics is quoted in P. Levy's biography of Moore: "After insisting that 'right conduct' depends so much on good results, I think it would be absurd not to try to indicate what results are good. I don't know what Keynes's view about goods and organic unities is. But it seems to me plain that, in the form you mention it, it must be wrong" (P. Levy, Moore, p. 258; Moore's letter to Russell is in the Russell Papers at McMaster University).

20 Keynes did not accept Moore's Platonic contemplation as early as 1905. In contrast to what he wrote in his 1938 My Early Beliefs, in that year Keynes had already "reached" Plato's later *Dialogues*, the *Republic*, the *Laws* and, I add, also Aristotle's writings on ethics and politics. He read Plato's *Republic*, the *Symposium* and Aristotle's *Politics* during the Easter Vacation 1905 (Keynes MSS, Books read during Easter Vacation 1905. He read Plato's *Laws* on 1st December 1905, the *Philebus* on 19 January 1906, Aristotle's Ethics (*Eudimian Ethics* and *Nicomachean Ethics*) on 20-23 January (Keynes MSS PP/40 Diary 1905-6).

reading of Aristotle himself. During the same period (1905-6) Keynes read Aristotle's writings on ethics repeatedly. [21]

5. Happiness as tragic Aristotelian eudemonia

In the previous section on Greek tragedy's legacy, we have seen that Keynes's concept of happiness is in contrast with pleasure and may be associated with pain. It is now clear that Keynes's notion of happiness is to be connected with tragedy. In his 1905 Virtue and Happiness Keynes considers Hecuba in the Euripides' Troads as happy. For him, heroic states of mind are happy. The tragic hero is happy. In fact, heroic states of mind are the manifestation of intense feelings and passions; but heroic and noble states of mind are often associated with tragic states of affairs. Thus happiness is connected with tragedy and pain, that is with tragic and bad states:

> For, instance, persons, in such situations as we call tragic, may I think be at the same happy in the sense I am suggesting. When at the end of the Troads, despite and through the overwhelming horror of her situation Hecuba suddenly realises the splendour of her own tragedy, she is happy. There is an element of happiness in most heroic states of mind. Occasions, felt intensely to be good, are happy. A man, who feels securely that he has a grip on something really worth having, is happy. A man, who sees ail lead suddenly to good, is happy. (Keynes MSS, *Virtue and Happiness*, written after the Easter Vacation 1905, p.8)

Keynes's early attitude towards tragic happiness (goodness and pain together) is recurrent in his thought. It is taken up by him again in 1928. In the letter to his friend F.L. Lucas on 19 April 1928, he reaffirms that noble states are associated with "troubles, misfortunes, and disasters":

> In actual life many of the feelings which we deem noblest and most worth having are apt to be associated with troubles, misfortunes, and disasters. In itself we generally judge the state of mind of the hero going into battle as good - but it is a pity that he should be killed. Similarly, feelings of sympathy are good in themselves. In fact, the worst of real life is that feelings good in themselves are too often stimulated or occasioned or provoked by evil happening (Keynes MSS General Correspondence, Letter to F.L. Lucas)

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21 In the sixties of last century, attention was paid to plurality and the mutual irreducibility of goodness by many authors. In 1963 Von Wright stressed the plurality of goodness in his book on "the variety of goodness". In 1966 B.A.O. Williams did the same in his article "Consistency and Realism". After that Bernard Williams was very critical of both the utilitarian and Kantian theories and revived ancient Greek thought in ethics. He was also sceptic of all systematic theorising in ethics. In 1969 Isaiah Berlin pointed this theme out in his Introduction (p. xlix,) to his book *Four Essays on Liberty*. In the seventies the theme was revived by David Wiggins in his 1976 "Truth Invention and the meaning of Life", now reprinted in his 1987 Needs, Values, Truth, Essays in the Philosophy of Value. In 1988 Shelly Kagan denied that different sorts of good and the factors that go into moral calculation are generally separable.

From ethics the theme entered into economics where attention was paid to plurality and the mutual irreducibility of goodness, in particular by Amartya Sen in his 1981 article Plural Utility. From Sen's early contribution the theme has now fully entered recent economic literature (see Broome 1991). It is to be noted, however, that none of these authors has noticed that this same point lies right at the beginning of Keynes's own reflections on ethics and probability and is also at the root of his notion of radical uncertainty.

The "fragility of goodness"

Keynes believed that states of mind should not be evaluated in isolation, that is apart from the state of affairs associated with them: pity requires somebody or some situation to be pitied. Keynes's notion of happiness means that human goodness is fragile and happiness is tragic. In the ancient Greek view of ethics, noble and heroic states of mind were constantly associated with tragedy, disasters and dilemmas. In her book on Greek tragedy, Martha Nussbaum (1986) calls these situations, "the fragility of goodness". In these situations, whatever we do will cause pain to somebody else. It will cause something we will regret. This brings to indecision and vacillation in human judgement and action. Decision making in these situations is characterised by uncertainty.

The Greek legacy of the ethics of virtues against Utilitarianism

Keynes's ethics is an ethics of virtues in the way ancient Greeks - and Aristotle in particular - understood it. It emphasises the importance of friendship, moral emotions and pays precise attention to the contextual relativity of right action and conduct. Keynes's notion of changing circumstances in his concept of probability is here crucial: '[Practical Ethics] would concern itself with conduct; it would investigate the difficult questions of the probable grounds of actions, and the curious connection between 'probable' and 'ought'; and it would endeavour to formulate or rather to investigate existing general maxims, bearing in mind their strict relativity to particular circumstances" (Keynes MSS *Miscellanea Ethica*). A good life is a life worth being lived, that is a moral life: in *Egoism* Keynes maintains that to be good is more important than to do good (MSS *Egoism* 24 February 1906).

Keynes accepted the Aristotelian notion of the good and happy life. The Aristotelian influence on his ethics is clearly recognised by him. In a letter to Strachey of 23 January 1906: "Have you read the Ethics of that superb Aristotle? (...) There never was such good sense talked - before or since". And in a letter on 7 February 1906: "I have been deep in Greek philosophy (...) I don't wonder Aristotle put this intellectual activity first. Still I don't agree with him. Love first, philosophy second, Poetics third, and Politics fourth" (quoted in Skidelsky 1983, vol. I p. 167). In his *Miscellanea Ethica* of 31 July 1905, he writes that speculative ethics should deal with the nature of beauty and tragedy and love and the attitude a man should have towards truth. There is also an explicit reference to Aristotle here and to his conclusions considered wise and unsurpassable. In a passage we have already seen, he points out that in the end the conclusions will appear no wiser than Aristotle's: 'Speculative ethics ...The nature of beauty and tragedy and love and the attitude a man should have towards truth would prove of interest in the discussion, though the conclusions appear in the result no wiser than Aristotle's' (MSS *Miscellanea Ethics* 31 July 1905).

Keynes's notion of happiness also recalls Aristotle's happiness ("eudaimonia"). Keynes himself points out its connection with Aristotle's notion in his Virtue and Happiness: "Sometime, perhaps always, the Greeks, and especially mr. Aristotle, came nearer to meaning this" (p. 11). Aristotle's happiness is the state of one's life having a point or meaning. A meaningful life is just a sum of activities worthwhile in themselves (*Nichomachean Ethics* 1097b 17). "Eudaimonia" is the activity of soul in accordance with virtue. One deliberates about what kind of life he wants to lead. Virtuous person are contrasted with persons dominated by techne: the latter are persons whose reason has nothing to do with the real ends of human life. In the ancient theories of good life, the goal of human choice is eudaimonia, happiness or "human flourishing, the good (complete) life for a human being. Aristotle claims that the goods that make up human good are not unitary: "But of honour, wisdom and pleasure, just in respect of their goodness, the accounts are distinct and diverse" (*Nichomachean Ethics* I,6 1097a24). In line with Aristotle, Keynes believes that the good life has necessary material and institutional necessary conditions. Unlike most forms of Kantian ethics, ancient ethics insists on the necessity of material resources for the exercise of virtue. The good life requires material prerequisites for human flourishing. For Keynes, the task of political economy as a moral science and of economic policy is precisely to supply these material conditions for the good and happy life: they are necessary material preconditions for it (see Carabelli and De Vecchi 1996).

The superiority of common sense morality over consequentialism lies in the fact that it allows for such varying sources of moral obligation and thus can accommodate the complexity of moral life. The existence of dilemmas is but one illustration of the richness, subtlety and difficulty of moral life.

5. Aesthetics as sublime: "tragic beauty"

In ethics Keynes believes in the existence of a plurality of heterogeneous ends and values. This is also true for his view on aesthetics (MSS *Beauty* 3 October 1905, p. 30). In his undated paper "On beauty and Art. On Art criticism and the appreciation of Beauty", he writes:

> But it is my opinion that the larger number of errors and quarrels concerning aesthetic theory are due to a neglect to notice that there are many and as different kinds of beauty as of virtue and that those differing classes which are just entitled to the general name of beautiful are with difficulty distinguished from yet wider class and further the usurpation of the title for one particular but varying division of the general class" (Keynes MSS *On beauty and Art. On Art criticism and the appreciation of Beauty,* undated, p.5).

Keynes sees "many different kinds of beauty as of virtue" (Keynes MSS *On Beauty and Art*, undated, p.5). In ethics, the central element is his notion of tragic happiness (goodness and pain); in aesthetics, tragedy also plays a role. The central notion is tragic beauty and the theory of sublime (beauty and horror).

In his essay *Beauty,* he firstly distinguished between moral excellence and moral beauty (MSS, *Beauty,* pp. 24-25). Then he adds "tragic beauty" to them: 'tragic beauty. I am taking these as instances of the different kinds of aesthetic fitness. Tragedy has a beauty of its own' (*Beauty* 3 October 1905, UA/23.2/3 ,p. 30) . In his *Virtue and Happiness*, as seen, he also refers to Hecuba's situation as "the splendour of her own tragedy" when discussing happiness: 'When at the end of the Troads, despite and through the overwhelming horror of her situation Hecuba suddenly realises the splendour of her own tragedy, she is happy' (Keynes MSS *Virtue and happiness* p.8).

From these passages it is clear that Keynes is influenced by the concept of "sublime" in his view on aesthetics. The theory of sublime represents the evolution of English aesthetic taste from the classicism of the first part of the eighteenth century to the romanticism of the end of that century. In aesthetics, sublime represents the praise of the genius and hero over and above any rules. In art, sublime represents a re-evaluation of irrational and fantastic elements and an appeal to sentiment rather than to cold reason: we speak of Michelangelo's "terribleness"; the picturesque of Gothic buildings; and Blake's prophetic visions.

There is a substantial difference between the concepts of beautiful and sublime. A tragic element is present in the latter. One of the most powerful elements of sublime is the existence of two opposite ideas; their conflicting nature is brought together and concurs to produce the sublime: for example, horror and beauty; splendour and tragedy. In the sublime the idea of attraction of opposites exists. In his early papers, as seen above, Keynes writes of the "tragic beauty", the "splendour of her own tragedy" tragedy and the "overwhelming horror" when referring to Hecuba's situation.

7. Moral and rational conflicts and dilemmas

The existence of a plurality and variety of goodness (as well as of beauty) implies the possibility of a clash between compelling, opposite and irreconcilable claims; hence the possibility that the character of our value structure is indeterminate. Ends, goals and concerns that the agent brings to a situation may be diverse and incommensurable and may not in themselves dictate any determinate decision and choice. As Aristotle notes, we face an indefinite or infinite range of contingencies with only finite powers of prediction and imagination (Nichomachean Ethics 1137b).

7.1 Keynes on moral conflicts and dilemmas

Keynes refers to moral conflicts and dilemmas in many places in his early writings and he also paid attention to various types of conflicts in his early writings: the conflicts of duties, moral claims, values, interests and desires. In particular he refers to:

(a) the conflict between rational egoism and rational benevolence (MSS Modern Civilisation, 28 October 1905 and Egoism 24 February 1906)22

(b) the conflict between "being good" and "doing good". In his paper Egoism:

> But is the obligation to do good? Is it not rather to be good? ... Suppose they conflict: which is then paramount? The long train of English ethical philosophers have either accepted the paramount authority of Egoism or have expressly reconciled the conflict and harmonised the moral consciousness by invoking the Justice of God or the essentially just order of the Universe. For my goodness and the goodness of the Universe both seem to have a claim upon me and claims which I cannot easily reduce to common terms and weigh against one another upon a common balance

> But why on earth should I sacrifice my peace and comfort in order to produce this quality in remote parts of the globe or in future time, where and when I shall have no opportunity of perceiving or appreciating it? Where is the motive? Where is the obligation? (Keynes MSS, *Egoism* 24 February 1906)

And in his paper Obligation:

> I think I know now - at any rate in some cases - what states of mind are good, but I still waver as to what ought to exist. And my attempt to identify the two has constantly led to difficulties (MSS, *Obligation*)

(c) the conflict between public and private life. In his 1905 Modern Civilisation Keynes already considers public life as equally important as private life and a possible source for conflict (MSS, Modern Civilisation).

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22 It should be noted -as Moggridge (1992: 112-3; see also 128-30) points out - that in *Principia Ethica* Moore has argued that "rational egoism was self-contradictory" and that "Sidgwick's method of resolving the conflict between rational egoism and rational benevolence which had required him to bring divine omnipotence into play had resulted from a false antithesis".

(d) the conflict between moral duties: between particular and general good; between the interest of the individual and the interest of the community. In his essay on Burke, Keynes comments on Burke's remarks on duties (Burke IV 166-7) admitting the possibility of a clash between them:

> Duties will sometimes cross one another. Then questions will arise, which of them is to be placed in subordination? (...) the possibility of a clash between the achievement of the greatest amount of good experienced by an individual and that of the greatest amount experienced by the community (Keynes MSS Burke, UA/20.1 p. 10-11)

Here Keynes explicitly refers to Agamemnon's tragic dilemma (either to save his daughter or to save his kingdom). In his view, Burke could not appreciate Agamemnon's tragic situation as he did not believe in a clash between the two interests:

> Agamemnon's behaviour to his daughter would not have met with approval in Burke's eyes, whether it were certainly conducive to general utility or not. He was aided in the maintenance of this position by the belief that there can be no clash between particular and general goods, that the real interest of individual always coincides with the interest of the community (MSS Burke UA/20.1 p.12)

In his view, Burke does not stress the conflict between particular and general good also because he is not really interested in distinguishing between the real interest of the individual and the interest of the community:

> he [Burke] is very careful to insert the word 'real' and it is possible that thus he hid from himself the latent difficulty. (...) he cannot be distinguishing *real* from *apparent* interest, for the maintenance of property is clearly of the latter type. I think he means that it is to the *real* interest of an individual that the greatest amount of good should exist, and if this is the case it plainly coincides with the general interest. (MSS Burke UA/20.1 p.12)

Keynes stresses that Burke's lack of perception of Agamemnon's tragic situations is to be linked with "his disbelief in the value to morality of a true analysis into moral judgements, prejudices, and motives - if not his belief in the active perniciousness of such analysis" (MSS Essay on Burke UA/20.1, p. 21).

(e) the conflicts of desires: in particular, the conflict between the desire for pleasure and for goodness.

Keynes devotes special attention to this last type of conflict in his paper *Virtue and Happiness*. Desires being multiple and heterogeneous, they may clash.[23] In Keynes's case the specific conflict is between the desire for pleasure and the desire for goodness. Both of these desires are ultimate, so they cannot be ordered on a univocal scale. Pleasure and goodness are both worthy in themselves, not only as a means for something else: he writes "both are alike in this respect". He considers the desire for pleasure and the desire for goodness as irreconcilable. Why are they irreconcilable? Because the two units of measure are incommensurable: "In the attempt to reconcile these two incommensurable units (...)". In Egoism the same point is re-stressed: "claims which I cannot

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23 On internal conflicts in desires and morals see Jackson 1985.

easily reduce to common terms and weigh against one another upon a common balance" (Keynes MSS, *Egoism* 24 February 1906). It means that there is no common unit of measure, no common balance on which to weigh the two heterogeneous desires. The two units of measure are heterogeneous; pleasure and goodness are qualitatively and dimensionally different:

> We seem to have these two conflicting kinds of judgement, a hedonistic judgement and an ethical judgement - both ultimate and both alike in this respect (...) We desire pleasure, and we desire the good; it is as little worth while to ask why in the one case as in the other; and the first is as much or as little of a purely psychological statement as is the second. It is - obviously enough - in the attempt to reconcile these two incommensurable units that a score or so of religions and philosophies have begun. (Keynes MSS *Virtue and Happiness,* written after the Easter Vacation 1905, p. 4)

In *Virtue and Happiness* Keynes criticises all the methods of reconciling this conflict adopted in history both by religion and philosophy. Four main methods are identified by him:
1) the good is only the pleasurable; this solution has been adopted by utilitarians;
2) the good is always associated with the pleasurable
3) to deny the authenticity either of the goodness or of the pleasure (the second is Moore's method);
4) it is a mystery.24

Keynes holds that all these four attempts to solve the conflict between these opposite claims can actually be reduced to two: either by reducing the two terms to one or by denying the existence of one of the two terms. The latter method is particularly interesting as it is Moore's method of solving conflict, a method which Keynes opposes. On this point Keynes's criticism of Moore is again typically Aristotelian. Let us recall that Aristotle, unlike Plato, stresses the plurality and the variety of goodness and the fact that good is not reducible to a univocal scale. In Keynes's view, Moore abolishes conflict by denying the existence of pleasure. In this way Moore avoids the problems of the incommensurability and non-comparability of magnitudes. In this way he reduces his notion of goodness to a univocal scale and to a common unit in a way similar to that of both Plato with his concept of good and the utilitarians with their concept of pleasure or utility. Thus, in Keynes's view, Plato, the utilitarians and Moore too, although in different ways, abolish conflict between the different kinds of goodness, by reducing goodness, pleasure or utility to a uni-dimensional magnitude. Keynes considers this unacceptable.

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24 The whole passage reads: "Some have solved the difficulty by denying the distinction - the good is the pleasurable. We know the arguments against that. The next method is to admit the distinction but to assert that the two are always found together, either in this life, which experience contradicts, or ultimately in the life to come, which you may believe or not as you choose. The third method is to deny altogether the claims or authenticity of one of the two, either the good - which is not considered respectable -, or of pleasure - which is the method of Moore. The last method is to regard the entire business as a holy mystery, and to hope for a higher synthesis out of time - not that this really lessens the mystery" (Keynes MSS Virtue and Happiness, written after the Easter Vacation 1905)

7. 2 Keynes on rational conflicts and dilemmas

The theme of rational conflicts is obviously connected with that of moral conflicts. In moral dilemmas a conflict exists between heterogenous moral claims, while in rational dilemmas a conflict exists between heterogeneous reasons, grounds, arguments or evidence (conflicting reasons). Moral dilemmas are dealt with by ethics; while rational dilemmas by logic. Conflicting arguments as well as conflicting moral claims lead equally to indecision, vacillation of judgement, indeterminate action and uncertainty: no general rule of decision to solve the dilemma is possible in either case:

> I cannot decide between the conflicting arguments; probably no general decision is possible. Sometimes the one and sometimes the other is true. (Keynes MSS *Beauty,* 3 October 1905, UA/23.2/3 p. 25)

In logic, rational dilemmas have been carefully considered by theorists. One of them is the dilemma of Buridan's ass which represents a typical situation of indecision. Keynes refers to this dilemma both in his early 1907-8 versions of the *Principles of Probability* and in his 1938 letter to Townshend (CW XXIX: 289, 294):

> "when there is no reason for preferring any one to any others, when there is nothing, as with Buridan's ass, to determine the mind in any one of the several possible directions" (MSS The 1907 version of *The Principles of Probability*: 75)

The dilemma is well known: the ass faces two equal heaps, one of straw and one of hay, but, being unable to choose between the two alternatives, dies of hunger. Truly, this dilemma is not a real situation of tragic conflict and dilemma as in this case the alternatives are equally *right* and there is a general rule of decision to overcome it: just eat one of the heaps. In real tragic conflicts and dilemmas, on the contrary, the alternatives are truly conflicting. In Agamemnon's moral conflict, for example, the two alternatives are equally ethically unacceptable and regretful: the death of his daughter Iphigenia and the death of his soldiers. In true rational conflict, both alternatives should be compelling reasons. Neither is more reasonable but the decision has to be taken anyway and with regret. In true rational conflict, further, the compelling reasons which back our judgement may not only conflict one with the other but move in opposite heterogeneous, eventually multi-dimensional, directions and we have to reach an overall judgement anyway.

Similarly to the case of moral dilemmas, to give rise to irresolvable rational conflict, first the reasons have to be plural. Second, they are to be non-homogeneous (or dimensionally different). Thus, there should not be a common unit of measure, a common balance to weigh or order reasons: reasons 'which I cannot easily reduce to common terms and weigh against one another upon a

common balance' (Keynes MSS *Egoism* February 1906). This raises the general problem of the incommensurability and non-comparabily of magnitudes.

In the beginning Keynes is interested in rational dilemmas mainly as concern probability: the conflict is between *some* reasons within probable judgement. As to probability, as seen, Keynes dealt with the incommensurability and non-comparability of reasons in probable judgements in his early 1907 and 1908 versions of *The Principles of Probability* and in the final 1921 version *A Treatise on Probability*. We have already seen how the theme of incommensurability and non-comparability of magnitudes spreads out from his theory of probability almost immediately to enter the heart of his economics: in his 1909 *Essay on Index Numbers*; at the beginning of *A Treatise on Money*; in chapter 4 of the *General Theory*.

Within a single judgement of probability, situations of rational dilemmas arise when there is conflict between incommensurable or opposite heterogeneous reasons (grounds or evidence) so that these reasons 'cannot be weighed one against the others'. As a result, the probabilities of the different alternatives cannot be ordered in terms of equal, more or less. In *A Treatise on Probability* the most vivid example is what I have called the dilemma of the umbrella. I have already quoted this relevant passage where high barometer and black clouds represent opposite and conflicting reasons:

> Is our expectation of rain, when we start out for a walk, always more likely than not, or less likely than not, or as likely as not? I am prepared to argue that on some occasions none of these alternatives hold, and that it will be arbitrary matter to decide for or against the umbrella. If the barometer is high, but the clouds are black, it is not always rational that one should prevail over the other in our minds, or even that we should balance them, - though it would be rational to allow caprice to determine us and to waste no time on the debate (TP, CW VIII 32).

When probabilities are rankable, situations of rational dilemmas can also arise when there is conflict between the different orders of probability. In this case, orders of probability are heterogeneous and move in different (opposite) incommensurable directions; they may even not be in the same dimension. Other situations can also arise when there is conflict between orders of probability and orders of goodness, or between orders of probability and orders of the weight of argument respectively.

> It has been argued that in these cases the probabilities are, in fact, not comparable. As in the example of similarities, where there are different orders of increasing and diminishing similarity, but where it is not possible to say of every pair of objects which of them is on the whole the more like a third object, so there are different orders of probability, and probabilities, which are not of the same order, cannot be compared (TP CW VIII 122).

In Keynes's economics, we find the theme of conflict and dilemma already emerging in the economic papers he writes for Marshall in 1905. In his 9th November essay on the comparison between the railway services of different nations he stresses the difficulties of using

incommensurable reasons of "different kinds" which move in different directions to reach a judgement as a whole. It is difficult to compare the railway services of Prussia and USA if the passenger and the freight services in the two countries move in opposite incommensurable directions:

> the matter will be argued under several different heads, and there is no method of making these different considerations altogether *commensurable*. There is no practical rule for adding and subtracting advantages and disadvantages of different kinds. When we have as many considerations before us as is possible, the best we can do is to summarise them in some general statement based rather on common sense than on any scientific principle.

> [the passenger service and the freight service of Prussia and USA] Any weighing of the two against one another is almost impossible (...) if, as it is probable, the passenger of Prussia is superior to that of USA and the freight service inferior, it is difficult to see on what principles we are to decide as to which country has the superior service on the whole (MSS 9 November 1905 *Economic Essays* marked by Marshall UA/4.1) [25]

His early interest in incommensurability and non-comparability in ethics and in probability may have been re-enforced by his discussions with Marshall as Raffaelli 1996 suggests. But it should be noted that these economic essays which Keynes writes for Marshall are posterior to his ethical paper *Virtue and Happiness* which was written after the Easter Vacation 1905 and in which he points out the negative "attempt to reconcile these two incommensurable units" (MSS *Virtue and Happiness* p.4). These essays are also posterior to his *A Scheme for an Essay on the Principles of Probability* of 5 September 1905.

In Keynes's economics, incommensurability and non-comparability are connected with his notion of complex magnitudes, such as real income, real capital and the general price level. In the *General Theory* Keynes likens the difficulties of the comparison of complex economic magnitudes with that of the two Queens, Queen Elisabeth and Queen Victoria, when orders of happiness and goodness move in opposite directions. The 1936 comparison recalls the 1905 comparison of the different kinds of railway services in Prussia and USA. The passage ends, in an Aristotelian way, with a reference to "mock precision":

> To say that net output to-day is greater, but the price level lower, than ten years ago or one year ago, is a proposition of a similar character to the statement that Queen Victoria was a better queen but not a happier woman than Queen Elizabeth - a proposition not without meaning and not without interest, but unsuitable as material for differential calculus. Our precision will be a mock precision if we try to use such partly vague and non-quantitative concepts as the basis of a quantitative analysis (GT, CW VII, 40).

The rational dilemmas of the umbrella in *A Treatise on Probability*, of the two Queens Victoria and Elizabeth in 1936 *The General Theory,* of Buridan's ass in Keynes's letter to Townshend in 1939 (CW XXIX) are some of the examples to which Keynes refers in his later

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25 See also a passage from his essay on index numbers of 31 October 1905 which he wrote for Marshall: "In [question] (a) we are treating a vague question (for general purchasing power is a vague expression) with perfectly definite data. (...) difficulties (...) arise from the inexplicit character of our object and we require practical judgement" (Keynes MSS An essay on index numbers IN/1).

writings. Certainly in comparison to the great moral dilemmas of Agamemnon in Greek tragedy (the dilemma of whether to save his daughter or to save his kingdom) or to more recent Sofia's tragic choice, the rational dilemma of the umbrella described by Keynes is not very heroic. It is typically bourgeois, and slightly British as well. Keynes's solution to it is just to take the umbrella and waste no time (TP 32).[26] However, it does represent a situation of non-comparability of reasons in human decision and it can be applied to economic decision too. Rational dilemmas characterise situations of indecision, vacillation of judgement, of irreducible conflict where reasons (*some* reasons to be precise) cannot be weighed down. These situations are similar to tragic situations. They are the domain of intrinsic incommensurable uncertainty.

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26 To face dilemmas Keynes suggests making recourse to direct judgements on the situation as a whole and to intuition. Recourse to these solutions is not judged by him as irrational. On the rationality of decision in situations of dilemmas, see J. Polock 1984.

6. International relations: complexity, interdependence and multilateralism. A tragic dilemma

Recently David Vines (2003: 358) has suggested that, as a consequence of the failures of the nonsystem which replaced the Bretton Woods order, the current rediscovery of Keynes's thought about global integration may profit from a deeper understanding of the "focus and method" of his international macroeconomics and diplomacy.

Striking similarities do exist between Keynes's methodological treatment of complexity, incommensurability and irreducible conflicts, and the overall vision of international economic relations Keynes was to offer in 1913, in 1919 and in 1945. This again supports my view on the internal coherence and continuity of Keynes's method.

Keynes's methodological interest in international aspects starts with the 'complex' and 'coherent' Indian system in 1913. In his *Indian Currency and Finance*, Keynes concludes his book, with a methodological remark/statement stressing complexity and organic interdependence of monetary economics, which I have already quoted:

> The first affects my general treatment of the subject matter. I have tried to bring out the fact that the Indian system is an exceedingly coherent one. Every part of the system fits into some other part. It is impossible to say everything at once, and an author must need sacrifice from time to time the complexity and interdependence of fact in the interest of the clearness of his exposition. But the complexity and the coherence of the system require the constant attention of anyone who would criticize the parts. This is not a peculiarity of Indian finance. It is the characteristic of all monetary problems. The difficulty of the subject is due to it (CW I: 181-2)

In 1919, in his *The Economic Consequences of the Peace* and "The Reconstruction of Europe" (in Essays on Persuasion), German reparations are dealt with by Keynes looking at the organic interdependence of the European economy (CW II, 2, 150, 170, 186-7, see also chapter 6 on the interdependence between exports and imports). Keynes writes this work just about a year before the final revision of TP. The structure of his argument and of his methodology of criticism of the politicians engaged in drawing the conditions of peace are centred on their inability to consider the organic interdependence between the economic variables at work. In Keynes's view they reason as if they were in an isolated system characterised by independent atomic entities. Germany is seen by them as a monad. The redundancy of Keynes's organic metaphors on the whole and its parts, on the compositive fallacies is the rhetorical manifest of his method.

Following the valuable suggestion by Vines (2003: 358), in our 2007 paper on 'Current Global imbalances: Might Keynes Be of Help?', and in our 2008 paper 'Coping with complexity: Keynes and international economic relations in the aftermath of WWI", Mario A. Cedrini and I, we

tested the hypothesis of consistency between Keynes's general treatment of the economic material and the method he worked out to analyse the complex nature of international economic relations in 1919 and in 1945 (Carabelli and Cedrini 2007, 2008).

In our 2008 paper "Coping with complexity: Keynes and international economic relations in the aftermath of WWI", we have shown that both the critique of the Treaty of Versailles Keynes exposes in *The Economic Consequences of the Peace* (ECP) and the solutions he proposes to overcome the impasse of the European settlement reflect his effort to cope with the attributes of the complexity characterizing the economic organization of the continent. In particular we have shown that in line with his organicist attitude towards probability and economics, Keynes truly considers Europe as a "body" (ECP CW II: 2) or a "family" characterized by organic interdependence among the political and economic variables at play; that the European settlement is considered by Keynes as a situation of irreducible conflict – i.e. as a conflict typical of "ancient tragedy" (ECP: 3) in which, as seen, he has been interested right from the beginning – originating from the "real dilemma" (ECP: 58) of reparations; the cure, as in *The End of Laissez-Faire* (1926), lying outside the operations of individual countries, which cannot but aggravate the disease if they act alone. The cure lies in external assistance by countries only indirectly involved in such conflicts or able to adopt a public-spirited behaviour. Namely, a disposition to play that same role which Keynes (in *The End of Laissez-Faire*) requires to social institutions promoting general rather than particular interests, as a means to counteract the fallacies of composition typically associated, in his thought, with complexity and organic interdependence: a "farseeing statesmanship" combining "expediency and generosity" (ECP: 179), of the kind of that later asked for to Britain by Keynes in *Proposals for a Revenue Tariff* (1931). This act should take the form of Inter-Allied debts cancellation by the US in particular, as a prerequisite to launch the "shared responsibilities" plan, the "grand scheme for the rehabilitation of Europe" (1919) needed to overcome the impasse; as the starting engine, to put it differently, of a movement gradually enlarging the spectrum of countries disposed to take part in the adjustment to a more equilibrated world.

Again, striking similarities do exist between this analysis and the overall vision of international economic relations Keynes was to offer in the reform schemes of the Forties, as well as in the negotiations of the American Loan, with a view to reviving global multilateralism in a context of huge international imbalances. In the reform schemes of the Forties, as well as in the negotiations of the American Loan, with a view to reviving global multilateralism in a context of huge international imbalances, Keynes's methodological approach to international relations is again based upon organic interdependence and irreducible tragic conflict. In his 1945 memorandum

"*Overseas Financial Policy in Stage III,* Keynes argues that international economic interdependence requires a "shared responsibility" and a plan between creditors and debtors.

In our 2007 paper 'Current Global imbalances: Might Keynes Be of Help?', Mario Cedrini and I, we analyse the three alternatives ('Starvation Corner', 'Temptation' and 'Justice'), Keynes outlines in his 1945 memorandum comparing them with the large number of interpretations that have been proposed for current global imbalances. Competing views suggest peculiar prescriptions for their unwinding and predict extremely different future scenarios for world economy. The literature debate generally focuses on the sustainability of global imbalances. The great divide is between alarming concerns for the risks the former pose for world economic prospects and elegant theoretical justifications for their happy persistence with uninterrupted global growth. Perhaps surprisingly, typical literary reviews devote little attention to the type of adjustment, if any – unilateral, bilateral or multilateral – each suggested scenario for the imbalances' unwinding is tied to. In our paper we rearrange such views and reformulate the overall problem accordingly by the use of the three alternatives Keynes outlined in his 1945 memorandum for Britain's economic recovery and the restart of global multilateralism at the end of WWII.

There is also a striking continuity in diversity between the two situations. The lack of American assistance would have placed an overburdened Britain in a "Starvation Corner", with far from negligible risks for global economy. "Made in" interpretations about current imbalances, prompting for unilateral adjustments, easily transform into the so-called "gloomy views" stressing stress that a US recession, in particular, would likely result in a global austerity programme. We suggest taking Keynes's "Temptation" option, based on a US business-character assistance to Britain, as a metaphor for the "imbalances sustainability" views. Market mechanisms relying on the strength of the US economy, on the one side, and/or the tacit agreement of a revived Bretton Woods system on the other, would suffice to ensure stability. Keynes's "Justice" option called for a reconsideration of the adjustment burden between Britain, the US and the Sterling Area countries, and was motivated by the recognition of shared responsibility for a better ordering of future economic intercourse. In our paper the parallel is with current views showing awareness of the multilateral character of the imbalances. Such interpretations correctly assume that the needed multilateral response to global imbalances masks a collective action problem undermining the case for macro-economic coordination among the players involved. In presence of irreducible conflicts, justice needs no unilateralism (no "Starvation Corner" and no "Temptation") but international or 'super partes' institutions' intervention to face the organic interdependence in highly imbalanced international relations.

This should also induce to reappraise Skidelsky' (2000) "fighting for Britain" approach to Keynes's diplomacy during and after WWII, and calls for further research to investigate on the internal coherence of the focus and method of the economist's international macroeconomics (see Cedrini 2008b).

The rediscovery of Keynes's legacy might come in as a helpful preliminary guide to reassess the problem. David Vines' (2003) advice is to reconsider the "focus and method" of Keynes's "international macroeconomics". Cedrini and I, we stress the continuity between the method Keynes used to deal with global economic integration and that which generally qualifies him as a thinker of complexity. Keynes's imaginative attempts to the problem of highly imbalanced international relations were based on economic interdependence and recognition that the defence of particular interests against those of the system as a whole would have transformed them into a negative-sum game, to the detriment of the general welfare. In the search for a shared vision about current global imbalances and the conditions for their benign unwinding, Keynes's method might really be of help.

Conclusions

In this work I have advanced a coherent interpretation of Keynes's methodological continuity, which starts with probability, moves to ethics and aesthetics and then to economic magnitudes. It covers reasonableness, incommensurability and complexity, uncertainty and tragic choice, irreducible conflicts and justice. At this point we are able to appreciate not only what but why Keynes, in his introduction to the Series of *Cambridge Economic Handbooks* 1922-3, writes that "The theory of economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, which helps its possessor to draw correct conclusions' (CW XII, 856).

Keynes thought that ignorance and uncertainty are the two things to fear most. Both of them are related to human limited knowledge. Ignorance is the lack of known reason, even partial. In ignorance, no probabilities exist or, if they do exist, they are unknown, due to a want of reasoning powers or skills. Uncertainty is, on the contrary, intrinsic incommensurability of probabilities, i.e. it is it is theoretically impossible to say that two probabilities are equal or unequal (more or less). In this case numerical and quantitative (ordinal) comparison of probabilities is impossible. This intrinsic incommensurability is not due to a lack of reasoning power or a practical inability to know or to measure (compare) probabilities. It is due to the nature of the material of probability itself. Its material is non homogeneous, non divisible in equal homogeneous independent parts, non finite, non closed and is characterised by organic (partial or total) interdependence. Further it is relative to changing circumstances. The material is 'complex and manifold': its qualities move in opposite heterogeneous directions or dimensions. There is no common unit to measure the different quantities of probability; there is not a unique scale where to weigh the heterogeneous partial reasons. No tacit reductionism is possible. Keynes's constant stress on the organic interdependence of heterogeneous variables (parts) implies that

- no reductionism to a common or homogeneous unit of measure is possible (incommensurability is due to heterogeneity).
- no tacit introduction of the hypothesis of independence of variables (parts) is possible (there is organic interdependence)
- no resolution of conflicts among heterogeneous, opposite and compelling reasons or claims (values) is possible (irreducible tragic conflicts, uncertainty and justice).

No hypotheses of homogeneity and independence can be tacitly introduced into the analysis to measure quantities and to separate parts from the whole. Logical fallacies are in the way. To be able to draw correct conclusions and not falling into error, we have to avoid them: 'It is a method

rather than a doctrine, which helps its possessor to draw correct conclusions' (CWXII: 856). 'Any other way of applying our formal principles of thought (without which, however, we shall be lost in the wood) will lead us into error' (CWVII: 297). Logic of probability is non demonstrative inference and causality.

Uncertainty characterises tragic rational dilemmas. In situations of tragic dilemmas we cannot form a reasonable judgement; indecision and vacillation of judgement prevails, but as decision and action cannot be postponed, we have to decide anyway, notwithstanding the intrinsic incommensurability, causing pain to somebody and regret to us in any case. In moral dilemma, the conflict is between clashing moral claims; in rational dilemmas, the conflict is between opposite partial reason. The conflict is irreducible: it cannot be reconciled trough composition or compromise. Conflict remains open: problems of right action, duty and justice emerge.

The material of economics, as that of probability, is equally complex and requires a complex theory. The material of economics is non homogeneous, non divisible in equal homogeneous parts, non finite, non closed and is characterised by organic interdependence. It is also relative to changing circumstances. The material is complex and manifold: its qualities move in opposite directions or dimensions. There is no common unit to measure the different quantities of price levels, utility, capital and aggregate income; there is not a unique scale where to weigh their heterogeneous attributes. No tacit reductionism is possible. No reductionism to a unique unit of measure is possible; no hypothesis of independence can be tacitly introduced into the analysis to separate parts from the whole.

Economic theory should reflect the complexity of the economic material and its changing circumstances. Its method should be complex. The risk is of falling into logical fallacies and drawing non correct conclusions. A *General Theory* is a theory which does not introduce tacit hypotheses of homogeneity and independence. Its language should pay attention to logical fallacies, like the fallacy of independence (of composition or 'ignoratio elenchi') and the additive fallacy as logical paradoxes enter into economic reasoning like the paradoxes of saving (the more you spend the more you save) and of wages (wages are cost to be lowered but they are also expenditure to be raised). Being the material of economics organic and the economic systems open and not finite, we have to consider the back-causation: 'after we have reached a provisional conclusion by isolating the complicated factors one by one, we then have to go back on ourselves and allow, as well as we can, for the probable interactions of the factors among themselves' (CWVII: 297).

Economic theory should be able to face uncertainty, tragic dilemmas and irreducible conflicts. It should deal with limited knowledge, increasing it as much as it can and trying to be unconventional. In changing circumstances and with complex material, Aristotelian exactness more

than precision is required: Keynes once said that it is better to be 'roughly [reasonably] right than precisely wrong'. Probability supplies this reasonableness: a new method for a probable reasoning in economics: the object of economic analysis is, 'not to provide a machine, or method of blind manipulation, which will furnish an infallible answer, but to provide ourselves with an organised and orderly method of thinking out particular problems' (CWVII: 297). A reasonable theory gives us only 'some reason to believe'. The same is true for economic policy. As Keynes says, it 'convinces us', 'it cannot convict us'. Its justification is and remains only in terms of probability, i.e. in terms of reasonableness. Keynes's GT is an exercise in persuasion, supplying some reasons to economists so to change their reasonable beliefs.

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