

ECONOMICS AND ECONOMY IN THE  
THEORY OF BELIEF REVISION

## 1. INTRODUCTION

Plato laboured hard to characterize the difference between genuine knowledge and mere belief. He may be read as having claimed the knowledge is *justified true belief* (*Meno* 97e–98a, *Theaetetus* 201c–202d). This account became the standard analysis of knowledge for more than two millennia. Since knowledge entails belief on the standard account,<sup>1</sup> any attempt to fathom out the foundations of knowledge must include an analysis of belief. After Edmund Gettier (99) shook the standard account, many philosophers argued that the characteristic tripartite definition of knowledge needs to be supplemented by a fourth condition. One particular prominent avenue was to take the stability or indefeasibility of a belief under criticism as a necessary condition for it to qualify as knowledge – an idea that can also be traced back to Plato’s *Meno*. This suggests that it is not only the set of current beliefs but also the potential development of the agent’s beliefs that is relevant to knowledge.

Aristotle opened his *Metaphysics* with the statement that all men by nature desire to know (*Met.* 980a). How can this objective be pursued? If knowledge is (or implies) justified true belief then the agent has to check for justification, truth and belief. Ideally, from a first-person perspective, everything one believes appears to be justified, so this criterion is not helpful for the agent. Truth, on the other hand, is not transparent to an agent (it can only be judged from a third-person perspective). Again ideally, belief is transparent to the agent. As a matter of internal control, there is one thing that an agent can do in the pursuit of truth. Since knowledge entails truth and since contradictions cannot be true, the agent has to eliminate contradictions from his beliefs in order to avoid falsehoods.<sup>2</sup>

What is the role played by logic (deduction and induction) in the acquisition of knowledge? Deductive logic serves as a standard against which to measure whether potential belief sets are free of contradictions or not. Inductive reasoning always involves decisions as to which sentences to adopt. *Logic in a narrow sense* refers to formal models of deductive reasoning, axiomatic systems which should preferably come together with some semantic underpinning. *Logic in a wider sense* is the theory of good reasoning, providing us not only with the means to check candidate belief sets for consistency but also with a methodology for deciding which of the candidate belief sets to adopt. The choice of a belief set is based on *extralogical* considerations, but only if we refer to the narrow conception of logic. I will in this paper proceed on the assumption that logic does include rules that are relevant for processes of belief formation and transformation (which may be seen as a kind of inductive reasoning, see Spohn

(135)). We shall see that we can clearly distinguish an idea of *economical* behaviour (behaviour dictated by considerations of *economy*) from *economic* behaviour (behaviour as recommended by *economics*). We will ask to what extent the two ideas have as a matter of historical fact become embodied in formal models for belief formation and transformation, and we will address the question to what extent they *should* be respected in these models.

In this paper, I want to have a look at the role that economic or economical considerations may play within logic broadly conceived. In order to do this, I make extensive use of material that is discussed in more technical detail in other publications of mine ((128)–(131)). While I hope that the present paper affords a convenient survey of previous work, it may unfortunately not be readily accessible to people without any prior knowledge of the belief revision literature. Such readers are invited to check with the literature to which I refer. The first thing to do for us now, however, is to get an idea of what economics and economy are all about.

## 2. WHAT IS ECONOMICS?

One way of finding out what a term means is to look at the science that is supposed to study it. For the word ‘economic’, this seems to be an easy task. We just have to look at what economics is about. Dictionaries define ‘economics’ as the scientific study of the production, distribution and consumption of goods, services and wealth, or more concretely, the study of the system of trade, industry, money etc. But we want to dig deeper. According to Francis Y. Edgeworth ((92), p. 16), “[t]he first principle of Economics is that every agent is actuated only by self-interest.” This restriction to a completely selfish attitude has long been removed. The formal part of Edgeworth’s idea, however, remains valid. In the words of Herbert Simon: “The rational man of economics is a maximiser, who will settle for nothing less than the best.”<sup>3</sup> This still seems to be the dominant view, as is shown by a few more recent statements. Hausman (104) (Sections 1 and 2) gives the following summary of the dominant school in the 20th century:

The main ‘orthodox’, ‘neoclassical’, or ‘neo-Walrasian’ school models economic outcomes as equilibria in which individuals have done as well for themselves as they could given their preferences and the constraints on their choices. . . . Agents are rational in the sense that their choices are determined by their preferences, which are complete and transitive. . . . contemporary theoretical economics is largely a theory of rational choice. This may seem surprising, since economics is supposed to be an explanatory and predictive science of the actual interactions among people rather than a normative discipline studying how people ought rationally to choose, but it is indeed a fact.

In another handbook article, Rosenberg (125) tells us about the “assumptions of the ‘economic man’: that all agents have complete and transitive cardinal or ordinal utility rankings or preference orders and that they always choose that available option which maximises their utility or preferences”. Earlier the same author characterised economics as guided (or misguided) by an “extremal intentional research programme”, (124).<sup>4</sup> And what is being maximised is utility. According to Broome (88), pp. 21–22: “‘utility’ acquired the meaning: *the value of a function that represents a person’s preferences*. . . . The first principle of economics is . . . utility theory, . . . modern, axiomatic utility theory . . .”

What is common to these very abstract formulations of the basic tenets of modern economics is that economic agents are viewed as having definite preferences, and that when choosing actions or commodities, they aim at satisfying their preferences as well as the circumstances allow. It is important to note that not just any kind of preference is considered to be appropriate. Preferences have to be transitive and complete (technically speaking, they must be *pre-ordering* or *weak orderings*), in order to be representable by a suitably chosen utility function. Ties in preferences are permitted, of course, but incomparabilities are ruled out.<sup>5</sup> With a little exaggeration, one can say that economics is based on (or even: is an elaboration of) the theory of rational choice. Here, *choice* is called *rational* or *coherent* if and only if it is representable by a preference relation, and a *preference relation* in turn is considered to be *rational* if and only if it is representable by a *utility function*.<sup>6</sup>

*Economics*, then, is about *rational* rather than the *actual* behaviour of individuals.<sup>7</sup> The laws of economics should not be expected to be empirically adequate, they are valid only as idealisations, or as norms. Economics is based on a formalised variant of common-place folk psychology with individual-level explanation of free agents. It is essential to the research program of economics proper that processes pertaining to whole societies or economies are to be explained by, or reduced to, the behaviour of ego-centric, maximising agents.<sup>8</sup> Usually, it is assumed that comparability of preferences or aggregability of utilities across different individuals does not make sense. It is important, however, that the possibility of comparison and aggregation is taken for granted across different “attributes” or “criteria” of goods, as well as across different situations in which the same goods are available (in varying amounts). This is part of ordinal and expected utility theory, and I suspect that this may ultimately be the reason for the economists’ insistence on a person’s preferences being representable by a utility function.

In order to find out whether there is anything economic (referring to economics in this abstract standard sense) about belief revision, we will have to look for patterns of rational choice, i.e., choice that is maximising



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