COMMON KNOWLEDGE IN ECONOMICS

by

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Theories of rational decision-making recognize that agents often act on the basis of incomplete information. Before choosing, an agent must consider what he knows and what he does not know. A potential investor does not know that the price of a stock is going to go up, but he may have information which suggests it is likely to go up.

The most interesting economic environments involve more than one agent. In such situations agents must think not only about what they know, but also about what the others know. Nobody can buy stock unless somebody else is selling it. If the buyer has information suggesting the price will go up, perhaps he should consider that the seller might have information indicating that the price will go down. If the buyer further considers that the seller is willing to sell the stock having also taken into account that the buyer is willing to purchase the stock, should he still buy? Does the answer depend on how rational the agents are? For example, suppose one of them always ignores unpleasant news. Does that affect the chances for a sale?

Can rational agents agree to disagree? Is there a connection between this question and whether rational agents will speculate in the stock market? What relevance is the degree of rationality of the agents? Or the length of time they talk before agreeing to disagree?

A crucial role in the analysis of these questions is played by the notion of common knowledge. We say that an event E is common knowledge among a group of agents if each one knows it, and if each one knows that the others know it, and if each one knows that each one knows that the others know it, and so on. Common knowledge is thus the limit of a potentially infinite chain of reasoning about knowledge.

In different situations, different kinds of events are common knowledge, and with different consequences. Public events are the most obvious candidates for common knowledge, even when their occurrence is due to causes entirely independent of the agents in question. When the agents bring about the events themselves, as for example in collectively designing the rules of some game or agreeing to some contract, the plausibility of common knowledge is strengthened. Certain facts about human nature might also be taken to be common knowledge. We are especially interested, for example, in the consequences of the hypothesis that it is common knowledge that all agents are optimizers, i.e. maximize their utilities. Finally, it often comes about after lengthy periods of observing behavior that what people are going to do is common knowledge, though the reasons for their actions may be difficult to disentangle.

The purpose of this chapter is to survey some of the implications for economic behavior of the hypotheses that events are common knowledge, that actions are common knowledge, that optimization is common knowledge, and that rationality is common knowledge.

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