Abstract. A crucial problem in economic decision (game) theory is to specify by an algorithm the standards of behaviour which determine the process of decision-making. Recent research has indicated that the attitude to risk is an important argument for finding unique solutions for decision problems. In this study different behaviour-constants of decision-making are reported which clarify that a logical equivalency exists between decision-making, conflict, achievement motive and risk-taking. By using information theoretic arguments as a transform rule, it is suggested to measure risk-preference and risk-aversion in terms of redundancy and related measures.

1. Introduction

Problems of decision-making play a central role in the whole economic theory. These problems are characterized in the empirical context of economic policy not only by mere economic variables and relations, but also by properties of the individual and social standard of behaviour, by social stereotypes, attitudes etc. In the economic theory, however, reference is generally made to the validity of consistency assumptions dealing with the so-called economic rationalism. There is therefore in economic models very often no room for an explicit statement of the decision-maker's behaviour. All that seems to be subjective, is dressed in exogenous variables of the decision process. On the other hand, it may be true that particularly decision theory attempts to formalize certain 'subjective' relations by using the categories 'utility' and 'subjective probability' (dispositional belief as defined by the Bayesian School). But even these definitions serve only as techniques of proving, i.e. they refer only to the methods of calculation, without being able to define their concrete strategical contents on the background of decision-making.

To illustrate this problem, let us take an example from the theory of games. In a non-cooperative two-person zero-sum game two players compete with one another on the basis of strictly conflicting interests. If the Minimax Theorem holds (i.e. Maximin = minimax), every player has a uniquely defined strategy, the choice of which he will never have to regret. Even in case one player would have known from the start which

Theory and Decision 3 (1972) 107–125. All Rights Reserved
Copyright © 1972 by D. Reidel Publishing Company, Dordrecht-Holland
strategies his opponent would employ, he would have been unable to make a better decision, because the equilibrium strategies (equilibrium pairs) corresponding to the saddle point guarantee that player A gets a minimum gain (outcome), amounting to the 'value' of the game\(^1\), but at the same time save player B from a loss larger than this 'value'. In case of strategies which are not uniquely defined for both players (the maximin is now smaller than the minimax), one of the players could, however, take advantage of his opponent, if he were only clever enough to find out the strategies of his opponent. Understandably, neither player can be more clever than his opponent at the same time. Consequently, there is no specific reason why the player's behaviour should be considered as a constant. Von Neumann\(^2\), however, by-passes this difficulty by deducting from the symmetry of the game that in the long run each player can only expect an undecided result; that a deviation from the optimal strategy would therefore not be worthwhile: for if opponent B deviates from the optimal strategy prescribed by the solution of the game in order to take advantage of a 'fault' made by player A, he accepts at the same time the risk of falling into a trap laid by A. Consequently, both players will show defensive behaviour to prevent losses\(^4\). This defensive behaviour consists in purposely veiling the choice of strategies by using a sort of random mechanism, i.e. by mixing pure strategies. These mixed strategies form a probability distribution over sets of pure strategies. Thus the underlying probability concept has an actual strategic content, which may be translated by 'concealing' and 'defending'. Nevertheless, Von Neumann avoids to include explicitly the behaviour of the player as a psychological variable in the solution. He always has 'permanent optimality'\(^5\).

2. Standard problems of risk measurement

The Bernoulli principle\(^6\) is one of the most important rules of decision-making under risk. It would make little sense to consider this rule solely as a mathematical operator or algorithm and not make inquiries as to its contents of behaviour. For otherwise, contradictions which could result especially from the constructive procedure of the axiomatic method preferred by decision theory, could easily be overlooked.

The Bernoulli decision rule establishes a (consistent) preference order on a set of probability distributions (a set of stochastic independent