

CARDINAL UTILITY IN WELFARE ECONOMICS AND IN THE THEORY OF RISK-TAKING

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FROM most branches of economics the concept of cardinal utility has been eliminated as redundant since ordinal utility has been found to suffice for doing the job. Cardinal utility has been kept only in welfare economics to support the demand for a more equal income distribution. Recently, however, the concept of cardinal utility has been introduced also in the theory of choices involving risk.¹

The question naturally arises whether the concepts of cardinal utility used in these two parts of economics are the same thing or not. According to Messrs. Friedman and Savage, who are among the main initiators of the use of cardinal utility in the theory of risk-taking, the two concepts have nothing to do with each other: "It is entirely unnecessary to identify the quantity that individuals are interpreted as maximizing [in the case of choices involving risk] with the quantity that should be given special importance in public policy."²

In effect, the cardinal utility function has to be invested with quite opposite properties in each case. In welfare economics the marginal utility of income is assumed to decrease with a growing income. In the theory of risk-taking on

the contrary, increasing marginal utility is to be assumed to prevail over a considerable range, in view of people's willingness in the case of gambling to pay a price far above the actuarial value for a small chance of a large gain. Still, I do not think that these facts decide the matter.

It is, of course, clear that the concept of social welfare is vague enough to be compatible with quite divergent interpretations so that no particular interpretation can be proved to be logically "necessary." But I should like to show that there is a fairly plausible interpretation of the concept of social welfare—or, more precisely, of value judgments concerning social welfare—which brings the cardinal utility concept of welfare economics very close to the cardinal utility concept used in the theory of choices involving risk.

Value judgments concerning social welfare are a special class of judgments of preference, inasmuch as they are nonegotistic impersonal judgments of preference. If somebody prefers an income distribution more favorable to the poor for the sole reason that he is poor himself, this can hardly be considered as a genuine value judgment on social welfare. But if somebody feels such a preference in spite of being wealthy himself, or if somebody who is in fact poor expresses such a preference, but does it quite independently of the fact of being poor himself, this may well be a value judgment of the required kind.

Now, a value judgment on the distribution of income would show the required impersonality to the highest degree if the person who made this judgment had to choose a particular income distribution in

¹ See J. von Neumann and O. Morgenstern, *The Theory of Games and Economic Behaviour* (2d ed.; Princeton: Princeton University Press, 1947), pp. 15–31, 617–32; M. Friedman and L. J. Savage, "The Utility Analysis of Choices Involving Risk," *Journal of Political Economy*, LVI (August, 1948), 279–304; H. Markowitz, "The Utility of Wealth," *Journal of Political Economy*, LX (April, 1952), 151–58; M. Friedman and L. J. Savage, "The Expected-Utility Hypothesis and the Measurability of Utility," *Journal of Political Economy*, LX (December, 1952), 463–74.

² Friedman and Savage, "The Utility Analysis of Choices Involving Risk," *op. cit.*, p. 283, n. 11.

complete ignorance of what his own relative position (and the position of those near to his heart) would be within the system chosen. This would be the case if he had exactly the same chance of obtaining the first position (corresponding to the highest income) or the second or the third, etc., up to the last position (corresponding to the lowest income) available within that scheme.

This choice in that hypothetical case would be a clear instance of a "choice involving risk." Of course, in the real world value judgments concerning social welfare are usually not of this type, in that they do not presuppose actual ignorance of how a certain measure under discussion would affect one's personal interests; they only presuppose that this question is voluntarily disregarded for a moment. But they may still be interpreted as an expression of what sort of society one would prefer if one had an equal chance of being "put in the place of" any particular member of the society, so that the cardinal utility "maximized" in value judgments concerning social welfare and the cardinal utility maximized in choices involving risk may be regarded as being fundamentally based upon the same principle.

At the same time, this interpretation by no means excludes the possibility that the cardinal utility function may show some opposite properties in the two cases owing to a difference in the pertinent conditions.

When welfare economists compare the marginal utility of higher and of lower incomes, they have in mind people's habitual incomes. On this basis it is a reasonable

assumption that the wealthy derive, from a marginal dollar, less utility than the poor do. On the contrary, gamblers compare the marginal utility of their actual income with the utility they expect from a sudden large increase in their income, which latter is certainly much higher than the utility of this higher income would be for a person long accustomed to enjoying it.

Moreover, the disutility of being a loser in a voluntary gamble, in which everybody has had the same "fair" chance of winning, tends to be less than the disutility of being the loser in the social game envisaged by the welfare economist, in which the chances have been quite unequal from the very start. Thus there are valid reasons why gamblers should ascribe both a larger utility to a gain and a smaller disutility to a loss than might be expected on the basis of the cardinal utility function assumed in welfare economics.

At the same time, gamblers' notorious irrationality works in the same direction. Their confidence in their personal "luck" makes them overrate their chance of winning, while their imagination makes them overestimate the subjective satisfaction they would derive from a given gain.

To sum up, the analysis of impersonal value judgments concerning social welfare seems to suggest a close affinity between the cardinal utility concept of welfare economics and the cardinal utility concept of the theory of choices involving risk. On the other hand, the differences found in the quantitative properties of the cardinal utility function in the two cases can be accounted for without difficulty.