

Time is like money in the bank



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OPINION

Economics focus

Averse to reality

Aug 9th 2001

From The Economist print edition

Economics relies on a standard theory of how people deal with risk. This theory is obviously wrong

A GREAT deal of economic theory turns on how people cope with risk—one of the least escapable facts of economic life. The model that most economists rely on when they need to take account of risk in their pure or applied research is expected-utility theory. The trouble is, this theory has implications so absurd that it cannot be true.



People are commonly observed to be “risk averse” in everyday life—that is, they reject better-than-fair gambles. Suppose you were offered a 50-50 bet that paid you \$11 if you won and cost you \$10 if you lost. Given the odds and the pay-offs, the expected return for accepting this bet is 50 cents (50% of \$11 less 50% of \$10); and since this is a positive number, the gamble looks attractive. The fact that many people do turn down such bets does not trouble expected-utility theory. It has an explanation: diminishing marginal utility. As your wealth rises, each extra dollar is worth less to you than the previous one. Because the utility of extra wealth declines, it is not necessarily illogical to attach a lower subjective value to the upside of the gamble (50% of \$11) than to the downside (50% of \$10). All seems well: the facts and the theory sit comfortably together.

Unfortunately, if you think about it, they do not, as Matthew Rabin of the University of California, Berkeley, and Richard Thaler of the University of Chicago point out in a recent article^{*}. Consider the bet described in the previous paragraph, and imagine some unremarkably risk-averse person who turns it down. Now ask yourself this: knowing nothing else about the person, and assuming expected-utility theory to be true, how big a prize would you need to offer in a 50-50 bet to persuade him to risk losing \$100?

Knowing he turned down the \$11 prize, you might guess it would have to be more than \$110. Would \$220 be enough? The expected pay-off of that bet would be \$60 (50% of \$220 less 50% of \$100). Looks good—yet our putative risk-avoider would still turn it down. Things get worse. What about \$2,000? He would turn that down as well. All right, \$20,000. No, still too risky. Very well, \$2m; wait, what the heck, \$2 billion. Still no. Given only what you know about this risk-avoiding person, plus the truth of expected-utility theory, you are forced to conclude that he will reject *any* 50-50 bet costing \$100, regardless of the prize.

Risk-aversion of this degree is literally insane—yet rational, according to the theory. What is going on? To understand what the theory is doing, as Mr Rabin and Mr Thaler explain, you need to follow along with some arithmetic. Suppose that the person's initial wealth is W . Then rejecting the original lose-\$10 gain-\$11 bet implies that on average he values each of the dollars between W and $(W + 11)$ by at most ten-elevenths of the average value he puts on dollars between W and $(W - 10)$. This implies that the value he puts on the $W + 11$ th dollar is at most ten-elevenths of the value he puts on the $W - 10$ th dollar. In effect, then, our subject's marginal utility of wealth falls as his wealth rises, and rises as his wealth falls, at a rate of around 10% for every change of \$21. This phenomenally powerful multiplier so inflates the value he attaches to a loss of \$100, and so deflates the value he attaches to any gains, that no gain can be big enough to make the bet seem attractive.

The absurdity, as Mr Rabin and Mr Thaler emphasise, is not a trick reflecting particular assumptions, but is wired into the standard theory. “Expected-utility theory says risk attitudes derive solely from changes in marginal utility associated with fluctuations in lifetime wealth. Hence, the theory says that people will not be averse to risks involving monetary gains and losses that do not alter lifetime wealth enough to affect significantly the marginal utility one derives from that lifetime wealth.” The theory, in other words, implies that people should be

risk-neutral towards gambles involving small stakes—but they aren't.

Odds and ends

The question is, how to make sense of the fact that people will reject small-stake gambles and yet accept, as they are wont to, moderate-stake gambles provided the terms are good. The authors call for an approach based on two ideas (both mentioned on earlier occasions in this space): loss aversion and mental accounts.

Loss aversion is the idea that people feel the pain of a loss more acutely than the pleasure of a gain of equal size: changes in wealth, and their direction, are what count, regardless of levels. This directly explains why people turn down even very small gambles with positive expected gains. Mental accounting plays a complementary role. It is the idea that people judge financial risks in isolation, rather than alongside overall wealth and other risks. Small, better-than-fair gambles may look irresistible in relation to total wealth, because any losses will be negligible in that context; judged in isolation, especially given loss aversion, such gambles are much easier to turn down.

The authors argue that such decision isolation is pervasive, and explains many otherwise perplexing features of economic life—from the “equity-premium puzzle” to the otherwise contradictory facts that (a) lotteries are popular and (b) people are willing to pay outlandish prices to insure themselves against easily affordable losses (as with, for instance, optional extended warranties on consumer durables). The evidence against the expected-utility approach seems overwhelming, and the broad shape of an alternative, thanks to the earlier work of Mr Thaler and others, is reasonably clear. The greatest puzzle, perhaps, is that the old theory has not yet been discarded.

*“Anomalies: Risk Aversion” By Matthew Rabin and Richard Thaler. Journal of Economic Perspectives, Volume 15, Number 1.