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A consistency test of the time trade-off

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Abstract

This paper tests the internal consistency of time trade-off utilities. We find significant violations of consistency in the direction predicted by loss aversion. The violations disappear for higher gauge durations. We show that loss aversion can also explain that for short gauge durations time trade-off utilities exceed standard gamble utilities. Our results suggest that time trade-off measurements that use relatively short gauge durations, like the widely used EuroQol algorithm, are affected by loss aversion and lead to utilities that are too high.

JEL classification: I10

Keywords: Cost–utility analysis; Time trade-off; Loss aversion

1. Introduction

This paper studies the consistency of time trade-off utilities. The time trade-off is a widely used technique to elicit health state utilities. The EuroQol algorithm, a frequently employed algorithm to compute health state utilities, is based on time trade-off valuations (Dolan, 1997). Several studies provide empirical evidence that the time trade-off captures individual preferences for health well (van Busschbach, 1994; Dolan et al., 1996; Bleichrodt and Johannesson, 1997a). Richardson (1994) and Dolan (2000) give theoretical arguments in favor of the time trade-off.

Inconsistencies in time trade-off measurements were found by Stalmeier in several studies. Stalmeier et al. (1996, 1997), and Dolan and Stalmeier (2003) observed preference

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reversals between direct choices and time trade-off judgments for health states of low quality, i.e. health states that are close to or worse than death. They attributed these reversals to a proportional heuristic that people use in answering time trade-off questions. These preference reversals do not occur for health states that are clearly preferred to death.

The common endpoints in time trade-off measurements are full health and death. Stalmeier (2002) found inconsistencies in time trade-off utilities when the endpoints used in the elicitation vary. His findings indicate no problems for time trade-off measurements in which endpoints are held fixed, because he observed that the relative size of utility differences, which is the information used in cost–utility analyses, does not depend on the endpoints used.

The above findings suggest that time trade-off measurements may be problematic for health states close to or worse than death and in analyses in which the endpoints in the elicitation task vary. Time trade-off measurements that use health states clearly preferred to death and that do not vary the endpoints, which is the common case in cost–utility analysis, appear to be on much firmer ground. The present paper will show, however, that inconsistencies also occur in the latter case. What is worse, these inconsistencies are systematic and cannot be explained by random error. We show that the systematic inconsistency can be explained by loss aversion (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991), the idea that people evaluate outcomes as gains and losses from a reference point and are more sensitive to losses than to equally sized gains. The inconsistencies in the time trade-off decrease with the gauge duration used. This finding has interesting implications for the use of the time trade-off in health utility measurement. It also suggests that the EuroQol algorithm leads to health state utilities that are affected by loss aversion.

Two recent papers have also performed consistency tests of the time trade-off (Spencer, 2003; Clarke et al., 2003). Both studies found less evidence of systematic inconsistencies in the direction predicted by loss aversion. These two studies used different designs than ours, however, which may partly explain the difference in findings. We discuss these studies in Section 5 of the paper.

The paper is structured as follows. In Section 2 we describe the consistency test used in the paper. In Section 3 we explain how loss aversion can explain why the time trade-off might violate the consistency test in a systematic manner. Section 4 describes the design and results of two experiments that test the consistency of time trade-off measurements. Section 5 concludes the paper.

2. The consistency test

Let (T, X) denote T years in health state X. The conventional procedure to elicit the time trade-off utility of a health state A is to specify some gauge duration T_1 in A and to ask a client, a patient or a member of the general population, to specify the number of years T_2 in full health (FH) so that he is indifferent between (T_1, A) and (T_2, FH). The time trade-off utility of A is then computed as T_2/T_1.

Even though the conventional procedure is standard in time trade-off measurements, we might as well measure the utility of health state A through an alternative procedure in which the number of years in full health is specified and a client is asked for the equivalent number