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Does the value of quality of life depend on duration?

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Summary

The aims of this study are to investigate the feasibility of eliciting Time Trade Off (TTO) valuations using short durations; to determine the effect of contrasting durations on individuals' responses to the TTO; to examine variations within and between respondents' values with respect to duration; and to consider the insights provided by participants' comments and explanations regarding their reaction to duration in the valuation task. 27 participants provided TTO values using short and long durations for three EQ-5D states. Feedback was sought using a series of open ended questions. Of the 81 opportunities to observe it, strict constant proportionality was satisfied twice. 11 participants had no systematic relationship between duration and value; 11 provided consistently lower valuations in long durations, while 5 had higher valuations in long durations. Comments provided by participants were consistent with the values they provided. Mean TTO values did not differ markedly between alternative durations. We conclude that it is feasible to elicit TTO values for short durations. There is considerable heterogeneity in individuals' responses to the time frames used to elicit values. Further research is required to ensure that the values used in cost effectiveness analysis adequately represent preferences about quality and length of life.

Word count = 200

1. Introduction

The Time Trade-Off (TTO) is a widely used method for valuing health related quality of life. Trade-offs between length and quality of life are used to produce values anchored at 1 (full health) and 0 (dead) (with states 'worse than being dead' having a value less than 0). The EQ-5D value set recommended by the National Institute of Health and Clinical Excellence (NICE) (NICE 2008a) for use in economic evaluation evidence submitted to it is based on TTO values elicited from members of the general public (Dolan 1997) ('the MVH value set').

TTO values are obtained by asking study participants to imagine living in the health state to be valued for a specified duration (t), and then using an iterative questioning process to find the period of time in full health (x) which is equivalent to that in utility terms. In the case of the MVH value set, t was always set at 10 years. The use of these values in economic evaluation relies on the resulting values (x/t) being unaffected by the particular choice of t.

In formal terms, this is the assumption of constant proportionality. It requires that participants considering a given health state would always give up the same *proportion* of time (eg. 30%) in full health regardless of the specific length of time in that state they are asked to contemplate (assuming a zero discount rate) (Dolan and Stalmeier 2003; Bleichrodt and Johansson 1997; Stalmeier et al 2007). Various *a priori* reasons for violations of constant proportionality have been noted, particularly for severe states. For example, the notion of Maximal Endurable Time (MET) (Sutherland et al 1982) suggests that when contemplating very poor states of health, there may be a period of time which is willingly endured so as 'to put one's affairs in order', beyond which the state is deemed to be 'worse than being dead'. If this is the case, severe states may have a value >0 (better than dead) or <0 (worse than dead), depending on how long participants are asked to imagine surviving in it. On the other hand, if respondents imagine that they will get used to or learn to cope with certain health problems, then it is possible that the

valuation for the same hypothetical health state will rise as the duration becomes longer. More generally, the value for *any* health state may be contingent, to some degree, on its anticipated duration. The implication is that "The widespread practice of applying value sets derived in one duration, to the valuation of states experienced for different durations, will yield incorrect estimates of QALYs." (p. 366) (Buckingham and Devlin 2009).

There is, however, relatively little empirical evidence on the relationship between duration and utility of health states. Studies seeking TTO values for the EQ-5D from the general public have generally followed the MVH approach of employing a fixed duration of ten years (Szende et al 2007). More evidence is available for condition-specific states, although results are mixed. Some studies find values are not influenced by duration (Tsuchiya et al 2005), although these may in part be explained by participants' employing a proportional 'heuristic' (Dolan and Stalmeier 2003): confronted with varying durations, participants may attempt to apply a rule of thumb that yields artefactually consistent values with respect to time. Tsuchiya and Dolan (2005) conclude that longer durations are typically associated with lower values; however, some studies report consistently *higher* TTO values for long durations. For example, Stalmeier et al (1997) find that metastastic breast cancer and migraine were given higher values in long (15 year) compared to short (5 year) time horizons.

Identifying whether non-proportionality represents a fundamental problem in practice, rather than in theory - and the direction of influence on values - is important to the use of TTO values in economic evaluation. Better understanding the preferences underpinning non-proportionalities is also potentially important to finding ways of overcoming this issue – for example, by estimating a utility to duration function, or providing a suite of duration-dependent value sets, rather than the 'one size fits all' values currently used.

Further, while studies investigating duration have compared durations, such as 10 and 30 years, studies comparing the effect on TTO values of using much shorter durations are

rare.[1] Yet arguably, where such states do arise in real life, and as factored into economic evaluation, they are seldom experienced for long. There is therefore an argument for attempting valuations with much shorter valuations.

Moreover, the issue of constant proportionality is related to recent debate about the way survival at the end of life should be dealt with in NICE appraisals (NICE 2008b). The increased importance placed on end of life assumes that the trade off between quality and quantity of life applicable to other stages of life no longer apply at the end of peoples' lives. This may be interpreted to mean that the shorter duration of one's life affects how a given health state is valued.

This paper reports a pilot study which investigated the effects of including contrasting durations in TTO valuations. The aims are to investigate the feasibility of eliciting TTO valuations for short durations (weeks rather than years); the effect of contrasting durations on individuals' TTO valuations, the nature of variations within and between respondents with respect to duration, and to consider the insights provided by participants' comments and explanations regarding their reaction to duration in the valuation task.

2. Valuation methods and data

The pilot study was part of a wider study focusing on the challenges of TTO valuations for health states worse than dead. The principal purpose of the pilot was to develop and test an elicitation protocol to be used in the subsequent study (Devlin et al 2009). The pilot was informed by a critical review of TTO methods with respect to the elicitation of values for states worse than dead (Tilling et al 2008), which led us to select a TTO approach described by Robinson and Spencer (2006) because of particular advantages it had in this respect. The method simply introduces a 'lead time' in full health preceding

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[1] An exception is Buckingham et al (1996) who compare 'lifetime', 12-month and daily variants of the TTO in valuation of participants' own health states.

each of the alternatives presented in the conventional TTO. The lead time increases the amount of time that is available for 'trading'. Participants who consider that a state is worse than being dead will reflect this by trading their lead time. This avoids the problem in the MVH protocol of requiring different elicitation methods for states better and worse than dead. For further details, see Devlin et al (2009).

We developed an interview protocol for the lead-time TTO by adapting the conventional study design used in the MVH study. A TTO board used to illustrate the trade-offs was designed so we could switch between two contrasting durations: in one the states to be valued lasted 10 weeks, in the other for 10 years. The 'lead time' was 10 weeks and 10 years respectively.

The pilot employed three TTO procedures: one for the longer duration; one for the shorter duration and the conventional MVH approach, which also used the longer (10 year) duration. Participants were presented with three EQ-5D health states: *some* problems on each of the five dimensions ('22222'); *extreme* problems on each dimension ('33333'); and an intermediate state containing a mix of *some* and *extreme* problems ('23323')[2]. The order of the TTO procedures was varied between interviews so that approximately half of the interviewees encountered the short duration TTO first, and half the long duration TTO. The long duration lead-time TTO was paired with the MVH in this process, so that the two 10-year duration TTO procedures were always undertaken sequentially.

A convenience sample of 30 administrative staff was recruited at City and Sheffield Universities and invited to interviews.

Following the TTO, participants were taken through a process of guided reflection on their valuations and their feedback - including explicit comparisons between the

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[2] *Some* problems with mobility, *extreme* problems with self care, *unable* to perform usual activities, *moderate* pain/discomfort and *extremely* anxious or depressed.

elicitation methods - sought using a series of open-ended questions. Interviews were digitally recorded with participants' consent, and their verbal responses to the elicitation procedures noted by the interviewers. Interviews were undertaken by KB and ND in London, and by CT in Sheffield. Further details of the interview scripts and physical props are available on request to the authors.

To calculate the values from the lead time TTO responses, the lead time is subtracted from both the numerator and the denominator to give a result comparable with the conventional TTO. Where the lead time is 10 years (or weeks), $U(H_i) = (x - 10)/20-10)$. If at the point of indifference, 'x' years in full health is *greater* than the lead time preceding the state being valued , the value will be positive; if it is equal the value is equal to 0, and if x is *less* than the lead time, the value will be negative. The minimum unit of trade was 6 months.

Our focus in this paper is to isolate the effect of duration on utility – our analysis therefore focuses on comparing the long and short duration lead time TTO data (i.e excluding the MVH, comparisons of which data are confounded by differences in method other than duration). The effect of duration on the valuation of each state was considered both within and between respondents, and on the overall sample mean.

Comments made by the participants were examined and all those relating specifically to duration were extracted. Rather than imposing themes, we simply grouped these into those that were suggestive of higher values for short durations; those that were suggestive of higher values for long durations, and 'other'. These were further grouped by the order in which the durations were encountered. Participant IDs were used to link comments to valuation data.

3. Results

Three people were unable to attend their scheduled interview; in total, 27 participants aged between 18 and 63 years completed the TTO tasks and provided feedback on them. None of the participants had previously participated in health state valuation research.

Both short and long duration variants of the lead-time TTO were equally feasible for the participants to complete, judged in terms of participants' reported ease of completion and understanding, and in terms of the valuation data obtained. Participants receiving the long-to-short ordering of the TTO tasks were somewhat more likely to comment that doing the TTO in weeks was 'harder'. The aspect of the tasks most frequently reported by participants to be difficult was imagining living in very poor health states hypothetical to them, rather than valuation *per se*.

Table 1 reports participants' valuations of each state, and the differences evident between short and long durations. From the (27 participants x 3 states =) 81 opportunities to satisfy it, exact, or strict constant proportionality was satisfied twice. None of the participants' valuations exhibited constant proportionality over all three states. However, this test of constant proportionality requires *identical* values being obtained in each duration. The more relaxed the test (e.g. allowing for some margin of error) the more respondents will satisfy proportionality. Therefore, we also examined the extent to which conclusions about the violation of constant proportionality might differ depending on the degree of difference between values considered acceptable. Figures 1-3 show this for each of the three states included in the study. The horizontal axis represents increasingly relaxed criteria for the test, and the vertical axis represents the number of respondents that violate proportionality. For all three states, a larger proportion of violations were of the type where longer durations were given lower values.

In terms of within-participant results across states, for 11 participants, the effect of duration on values showed no consistent pattern; the remaining 16 participants provided trade off responses that were suggestive of duration exerting a systematic effect on values. Of those, 11 consistently provided lower values for long durations i.e. the

difference between the long duration value minus the short duration value in Table 1 was negative over all three states. However, 5 respondents provided valuations that were consistently *higher* for longer durations across all three states.

In terms of within-state results across participants, the majority of the differences in values by contrasting duration were accounted for by those with lower valuations in the long duration TTO. Of the 27 participants, 15 gave health state 22222 a lower value in the long duration; similarly 17 and 18 participants respectively gave lower values to 33333 and 23323 in the long duration TTO. One third of participants valued 33333 and 23323 more highly in the long duration, as did about 40% of participants with respect to 22222.

The contrasting durations provoked considerable reaction by participants regardless of the order in which these were encountered. Table 2 records the comments that participants made specifically with respect to the change in duration encountered in the valuation task. Participants are explaining how they found the two contrasting durations; they were not asked to explain why they came up with different values for the two durations, yet most of the comments are relevant to explaining the differences in values observed, including statements that in effect suggest constant proportionality does not hold.

Participants' comments regarding duration were generally compatible with the valuations they had provided, although in two cases (participants 1 and 14) their comments appear to contradict their valuation data. The order in which the TTO durations were encountered did not seem to exert an influence on the response to the valuation task. Fewer of the participants reporting higher values in the long durations provided comments which directly or indirectly explained this. Of those who did, two insights into the reasons for this emerge. First, optimism about the future, regarding either life events, or cures for the poor health state being considered and second, a preference to 'go out with a bang' now rather than put up with very poor health over a short life span. These attitudes would make people more willing to give up time to achieve good health in the context of short durations, with a corresponding lower value implied for such states.

Comments made by those whose values were lower in long durations were suggestive of MET-type reasoning i.e. that states which were intolerable considered over long periods could be 'put up with' in short durations.

Notwithstanding the considerable variation between participants' considered reaction to the different durations, at the aggregate level much of this washes out: the mean values for each state are broadly consistent between the contrasting durations.

4. Conclusions

Caution is required in drawing conclusions from an experiment on a small convenience sample. Further, values were elicited for a small number of EQ-5D states, all of which were moderate to severe. Nevertheless, our results suggest a number of conclusions.

We expected that the severity of the states would make it more likely we might observe MET-type preferences: lower valuations for long durations. In practice, the effect of duration was much more mixed both within and between respondents. While some of the observed differences will simply be explicable by the variation in response to stimuli common to all stated preference exercises, in the majority of cases participants' values and their comments were suggestive of duration exerting a systematic influence on TTO values. However, the *direction* of this effect differs between participants. More participants exhibited preferences consistent with the MET hypothesis than vice versa. Both groups were able to articulate clear reasons for the direction of influence duration had on their valuations.

While MET provides a clear rationale for explaining higher valuations in short durations, there does not appear to be any corresponding conceptual framework for the higher valuations in long durations that participants drew on. Adaptation is one reason why the

value of the same health state may increase over time, but none of our participants raised this possibility. An alternative explanation is that higher valuations for long durations arise because participants are introducing irrelevant exogenous considerations – for example, that they will be given pain relief if required to experience severe pain over a period of years, or factoring in some probability a cure will eventually be found. There is some support for this explanation in our participants' responses.

The heterogeneous nature of the results and opinions expressed by participants are interesting given recent policy announcements about the way health technology appraisals in the UK are to handle severe states for short durations at the end of life. The implication of NICE's recommendation is that, where certain conditions are met, life extension is given more weight than quality of life enhancement (NICE 2008b). It is not obvious that there is unanimous support for this among our sample. Some respondents clearly favoured quality of life enhancement over life extension when the duration of these states was counted in weeks as opposed to years.

Our finding of variation between individuals with respect to the effect of duration on TTO values finds support in some earlier empirical studies (Tsuchiya and Dolan 2005). However a full understanding of the duration to utility relationship remains elusive: existing evidence is limited by most studies using (as did ours) a very small number of durations (usually two), elicited from small samples, for a small number of states – in some cases generic, in others condition specific. Research is required properly to isolate the influence of duration across a wider range of durations and states – and to identify whether those for whom duration exerts a systematic effect, but in opposing directions, are also systematically different in other ways.

It has been noted that, for the purposes of CUA, the principal (some might argue, sole) consideration is whether *mean* values are stable across different durations, and that underlying heterogeneity is irrelevant. However, given the importance society appears to attach to the treatment of severe states - independent of QALYs gained - a better understanding of how severe health states are dealt with *within* QALY estimation will

continue to be important. Further, better understanding how individuals imagine the hypothetical experience of severe pain and other severe problems for long durations may yield improved valuation designs that reduce bias and may well affect mean values.

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References

Bleichrodt H, Johannesson M. (1997) The validity of QALYs: an experimental test of constant proportional tradeoff and utility independence. *Medical Decision Making* 17:21-32.

Buckingham K, Devlin N. (2009) A note on the nature of utility in time and health and implications for cost utility analysis. *Social Science and Medicine.* 68: 362-367.

Devlin N, Tsuchiya A, Buckingham K, Tilling C. (2009) *A uniform Time Trade Off method for states better and worse than dead: feasibility study of the lead time approach.* Economics Discussion Paper 09/x, City University (forthcoming).

Dolan P, Stalmeier P. (2003) The validity of time trade-off values in calculating QALYs: constant proportional time trade-off versus the proportional heuristic. *Journal of Health Economics* 22:445-458.

Dolan P. (1997) Modelling valuations for EuroQol health states. *Medical Care.* 35(11):1095-108.

National Institute for Health and Clinical Excellence (2008a) *Guide to the Methods of Technology Appraisals*. Publication reference N1618. London: NICE.

National Institute of Health and Clinical Excellence (2008b) *Appraising life extending, end of life treatments. Supplementary advice to the Appraisal Committees.* 30 December. www.nice.org.uk/media/88A/F2/SupplementaryAdviceTACEoL.pdf (website consulted March 5th 2009)

Robinson A, Spencer A. (2006) Exploring challenges to TTO utilities: valuing states worse than dead. *Health Economics* 15.4: 393-402.

Stalmeier P, Lamers L, Bussbach J, Krabbe P. (2007) On the assessment of preferences for health and duration: maximal endurable time and better than dead preferences. *Medical Care* 45(9):835-841.

Stalmeier P, Wakker P, Bezembinder T. (1997) Preference reversals: violations of unidimensional procedural invariance. *Journal of Experimental Psychology* 23(4): 1196-1205.

Sutherland HJ, Llewellyn-Thomas H, Boyd NF, Till JE. (1982) Attitudes towards survival. The concept of "maximal endurable time". *Medical Decision Making* 2:299-309.

Szende, A., Oppe, M., Devlin, N. (2007) *EQ-5D valuation sets: an inventory, comparative review and users' guide*. Rotterdam: EuroQol Foundation. Springer.

Tilling C, Devlin N, Tsuchiya A, Buckingham K. (2008) *Protocols for TTO valuations of health states worse than dead: a literature review and framework for systematic analysis.* Health Economics Discussion Paper 08/09, School of Health and Related Research, University of Sheffield, Sheffield.

Tsuchiya A, Dolan P. (2005) The QALY model and individual preferences for health states and health profiles over time: a systematic review of the literature. *Medical Decision Making* 25: 460-467.

Table 1. Participants' TTO valuations for short and long durations of three EQ-5D states, and patterns of differences.

ID	22222 years	22222 weeks	$22222_{years} - 22222_{weeks}$	33333 years	33333 weeks	$33333_{years} - 33333_{weeks}$	23323 years	23323 weeks	$23323_{years} - 23323_{weeks}$	Within respondent differences
1	0.500	0.400	0.10	-0.200	-0.400	0.20	-0.100	-0.200	0.10	all > 0
2	0.450	0.500	-0.05	-0.950	-0.500	-0.45	-0.350	0.000	-0.35	all < 0
3	0.450	0.650	-0.20	-0.500	-0.050	-0.45	-0.500	0.200	-0.70	all < 0
4	0.650	0.700	-0.05	0.450	-0.200	0.65	0.700	-0.350	1.05	mixed
5	0.400	-0.750	1.15	-1.600	-0.950	-0.65	-0.800	-0.600	-0.20	mixed
6	0.650	0.650	0.00	-0.550	0.150	-0.70	0.350	0.550	-0.20	mixed
7	0.900	1.000	-0.10	0.600	0.000	0.60	0.700	0.600	0.10	mixed
8	0.350	0.750	-0.40	-0.350	-0.150	-0.20	-0.150	0.700	-0.85	all < 0
9	0.500	1.000	-0.50	-0.400	-0.300	-0.10	-0.400	0.500	-0.90	all < 0
10	0.150	0.350	-0.20	-0.350	-0.100	-0.25	-0.350	-0.150	-0.20	all < 0
11	0.900	0.850	0.05	0.450	0.450	0.00	0.700	0.950	-0.25	mixed
12	0.800	-0.150	0.95	0.000	-2.000	2.00	-1.000	0.150	-1.15	mixed
13	0.600	0.300	0.30	-1.000	-2.000	1.00	-0.700	-0.800	0.10	all > 0
14	0.600	0.700	-0.10	-0.200	-0.100	-0.10	-0.150	-0.100	-0.05	all < 0
15	0.850	0.750	0.10	0.375	0.000	0.38	0.675	0.300	0.38	all > 0
16	0.450	0.250	0.20	-1.050	-0.650	-0.40	-0.450	-0.750	0.30	mixed
17	0.850	0.750	0.10	-1.550	-0.250	-1.30	-0.250	0.200	-0.45	mixed
18	0.000	0.050	-0.05	0.000	-0.550	0.55	0.500	0.850	-0.35	mixed
19	0.650	0.350	0.30	-0.350	-1.450	1.10	-0.150	-0.450	0.30	all > 0
20	0.350	-0.050	0.40	-0.550	-0.350	-0.20	-0.450	-0.350	-0.10	mixed
21	0.650	0.350	0.30	-0.250	-0.550	0.30	-0.250	-0.450	0.20	all > 0
22	0.950	1.000	-0.05	-2.000	0.250	-2.25	0.550	0.650	-0.10	all < 0
23	0.500	0.900	-0.40	-1.000	0.100	-1.10	0.000	0.300	-0.30	all < 0
24	0.200	0.250	-0.05	0.050	0.100	-0.05	0.200	0.300	-0.10	all < 0
25	0.350	0.750	-0.40	-0.050	0.200	-0.25	0.150	0.550	-0.40	all < 0
26	0.350	0.450	-0.10	-0.950	-0.450	-0.50	0.050	0.150	-0.10	all < 0
27	0.050	2.500	-0.20	-0.750	10.500	-0.20	0.050	-0.350	0.40	mixed
Mean	**0.52**	**0.48**	**0.04**	**-0.47**	**-0.38**	**-0.09**	**-0.05**	**0.09**	**-0.14**	
Across respondent differences			**11 > 0** **1 = 0** **15 < 0**			**9 > 0** **1 = 0** **17 < 0**			**9 > 0** **None = 0** **18 < 0**	**5 > 0** **11 = mixed** **11 < 0**

Note: Shaded cells indicate higher TTO values in long durations.

Table 2. Participants' comments regarding the effect of duration on the TTO task.

Valuation task ordering:	Comments indicating long duration TTOs produce lower values	Comments indicating long duration TTOs produce higher values	Other comments
Short to long	"With years less of a constraint – more willing to give a couple of years up".(9) "More serious if you had to live in them for years rather than months." (10) "I'd be prepared to trade off more time to avoid disability in the longer time horizon (16) "I wouldn't want to be in bad state for 10 years, so would be more prepared to give up time to avoid it." (17) "Definitely harder to endure a poor state for long time so death is more preferable" (25) " Its worse to live in a poor state for a very long time, while it might be bearable for a few weeks" (26) "It's harder to be in a poor health state for a longer period" (20)	"I was thinking about that there'd probably be some relief? Like, no one would be allowed to live for 20 years in extreme pain really would they. So, I was really thinking about there being some cures and stuff. I don't think it would really be like that for years and years" (15) "In weeks I'm thinking about my current state of mind, college and all that. I wouldn't meet anyone new or get involved in anything new, its just more weeks like what they are now, so I'd basically just be saying goodbye to everyone I know now. But 10 years –any thing could happen. Like, if I had a partner and a child, I'd probably be wanting to spend as much time with them as I can?" (15) "I think, when I'm older, I want to have a baby. And then I'd want to be around for that baby, no matter what" (14)	"Weighing up quality of life and length of life is easier with the 20 year horizon because it is a more relevant time period."(25) "The considerations are the same. The way I feel about these health states would be the same regardless of how long they last. It is the relative amount of good health and bad health that matters."(14) "I have to think about it more when one option is to live in very poor health state for a long time." (21) "Difficult to make a quick decision on what you would do in a given situation. I don't have children but if I did I would have given different answers" (26)
Long to short	"I would be prepared to put up with more of being poorly because time is of the essence when you're thinking you've only got 20 weeks." (1) "Easier to make decisions with weeks and I'm more prepared to "put up" with poor states for short times. (2) "It's more bearable to have poor life in weeks	"In the shorter period of time it was more important to me to have the best of health." (6) "When its years I thought 'oh I can cope with that', but when it comes to weeks, if I only had 10 weeks and if I was going to be depressed for 5 weeks, I'd rather just go out with a bang now than put up with that. I think your body can adjust to	"It makes it harder to decide when thinking in weeks".(8) "Harder to think in terms of weeks rather than years" (19) "Weeks were more an instant decision. More thought given to weeks."(18) "Can be more selfish if its just weeks left." (7)

	rather than years" (3) "The main thought is about putting your affairs in order."(8) "When it was 10 years, everyone can probably say what they think they'd put up with and tolerate and what they wouldn't. But when its 10 weeks, its closer to home and the boundaries shift a bit. Thinking about living like that for 10 weeks, yes I'd be prepared to do that because its bearable in a short time."(5)	pain and that over a long period of time.(4)

Note: Participant ID numbers shown in brackets in Table 2 match those in the 'ID' column in Table 1.

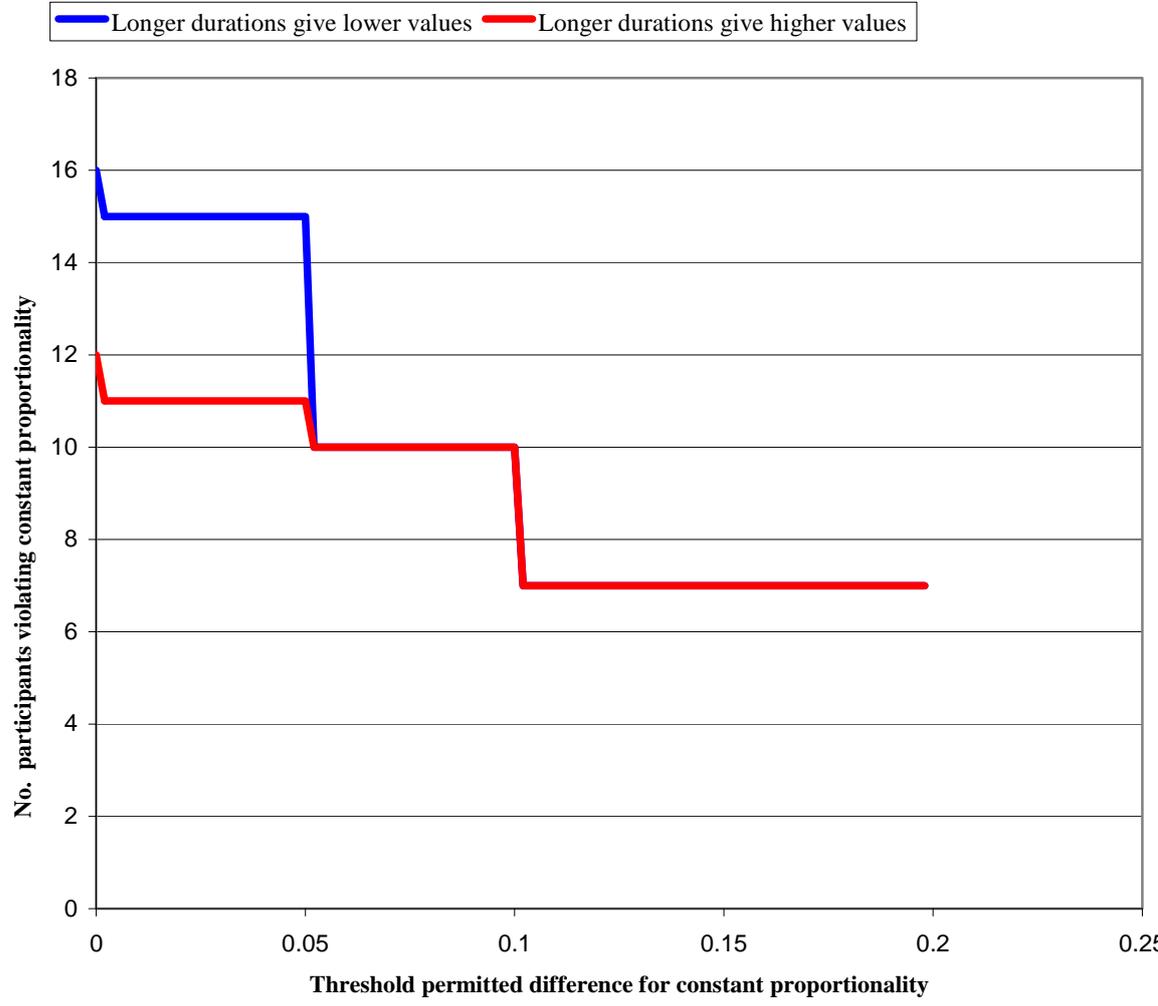**Figure 1. Comparison of valuations from short versus long duration TT**

Table 2. Comparison of valuations from short versus long duration TT

Legend: Longer durations give lower values — Longer durations give higher values

Y-axis: No. participants violating constant proportionality

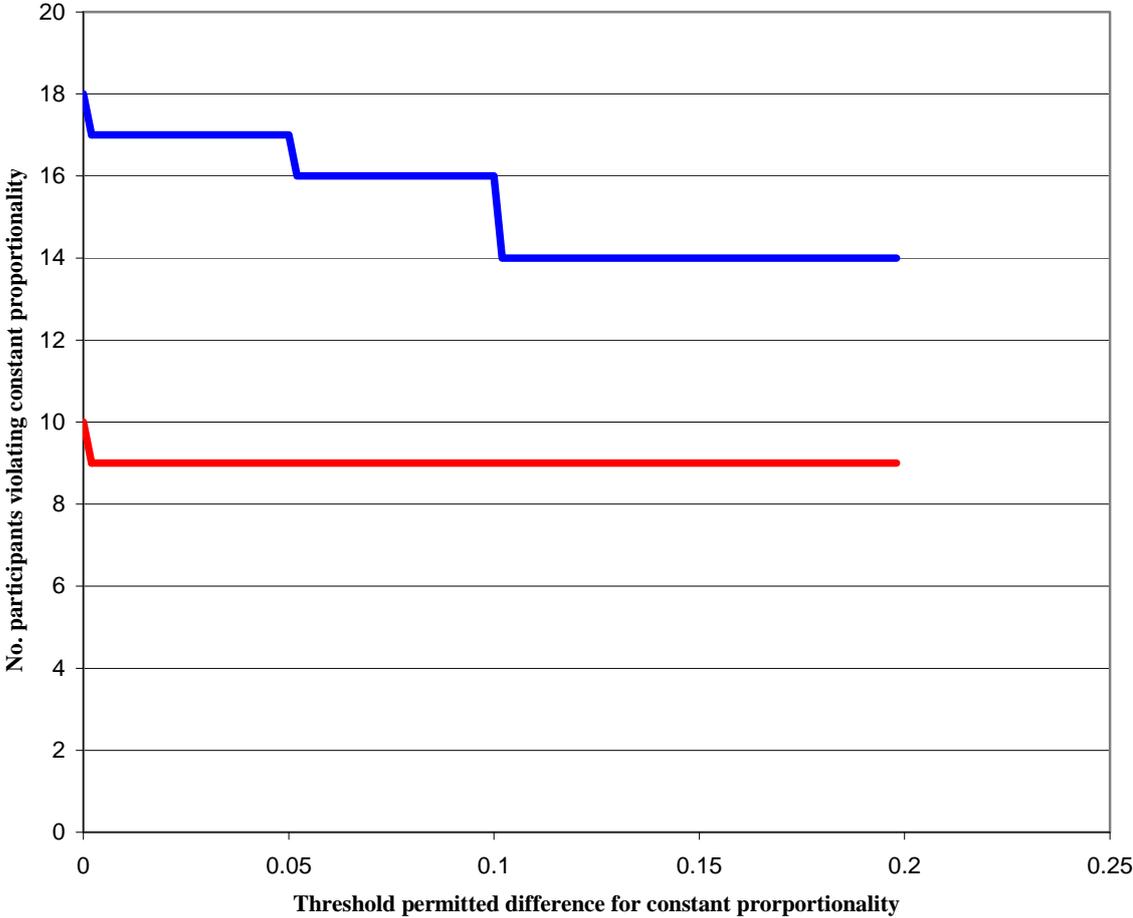X-axis: Threshold permitted difference for constant prorportionality

Figure 3. Comparisons of valuations from short versus long duration TT