The trade-off between money and time: A test of the theory of reference-dependent preferences

We formulate a model of reference-dependent preferences based on the marginal rate of substitution at the reference-point of a reference-free utility function. Using binary choices on the trade-off between money and travel time, reference-dependence is captured by value functions that are centered at the reference. The model predicts a directly testable relationship among four commonly used valuation measures (willingness to pay (WTP), willingness to accept (WTA), equivalent gain (EG) and equivalent loss (EL)). Moreover, we show that the model allows recovering the underlying 'reference-free' value of time. Based on a large survey data set, we estimate an econometric version of the model, allowing for both observed and unobserved heterogeneity. In a series of tests of high statistical power, we find that the relationship among the four valuation measures conforms to our model and that the constraints on the parameters implied by the model are met. The gap between WTP and WTA is found to be a factor of four. Loss aversion plays an important role in explaining responses; moreover, participants are more loss averse in the time dimension than the cost dimension. We further find evidence of asymmetrically diminishing sensitivity. Finally, we show that the fraction of 'mistakes' (in the sense that participants are observed to sometimes select dominated options), varies systematically in a way consistent with the model of reference-dependence. The results of the paper have important implications for the evaluation of infrastructure investment and pricing reforms in the transport sector.

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