

The Value of Statistical Life in a Pandemic Context: Age, Health, and Economic Preferences

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Introduction

Impacts on mortality tend to dominate the estimated benefits of health policies. How mortality risk reductions are valued in monetary terms is crucial in informing how much the government should invest in reducing mortality in society. Available estimates of how the public value one “statistical life” is known as a value of statistical life (VSL), which is based on the estimates of willingness to pay (WTP) for small reductions in premature mortality risk. There has been an intense debate over which VSL estimate to use to evaluate mortality risk reductions from health and lockdown policies introduced during the COVID-19 pandemic. A challenging issue has been dealing with the fact that most risk reductions accrue to older people. This demands further investigation on the one-to-one non-parametric relationship between individual age and individual WTP for mortality risk reductions. In addition, economists have found that economic preferences, such as risk, time, and social preferences, shape many COVID-19-related health behaviors. Nonetheless, little empirical evidence exists on how economic preferences are associated with VSL estimates. Most previous research relies on representative behavior, assuming a specific functional form of the relationship, and fails to identify the relationship between individual characteristics and value estimates. This paper addresses how age, economic, and social preferences are associated with VSL in the context of novel Covid-19-like diseases.

Survey Experiment

This study uses a state-of-the-art survey experiment method to investigate a relationship between age and VSL in the context of COVID-19 after controlling for economic preferences, cognitive ability scores, subjective baseline risk, subjective life expectancy, subjective and objective health conditions, and other individual characteristics. We propose a novel WTP elicitation method using dynamically optimized sequential experimentation to search the individual-level WTP. Based on an information theory and Bayesian updating, our elicitation method dynamically optimizes bids for the sequence of binary choices.

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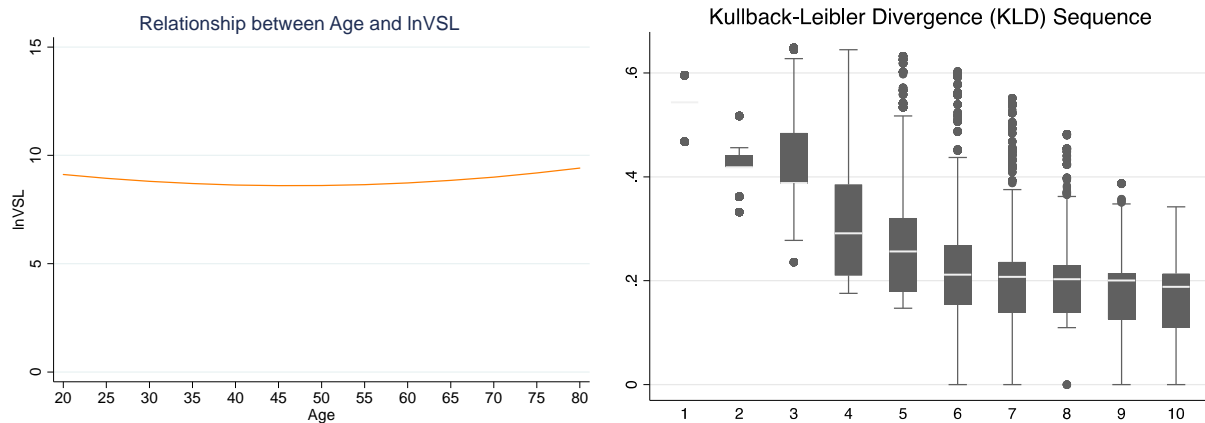
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We use this novel method to elicit individual WTP for a government policy that reduces the fatality risk of dying from the Covid-like disease from 10/100,000 to 1/100,000 on average. A self-administered online survey was conducted in July 2022, following a pre-test survey with 400 participants in January 2022.

Results

We find the following results from an online survey experiment with more than 1400 adults aged between 20 and 79 years in Japan. First, our data results in an average VSL estimate of 8.77 billion JPY (6.14 million USD as of the time of the survey) and a median VSL estimate of 1.64 billion JPY (1.15 million USD). This estimate is in the range of the OECD recommendation. Second, the VSL estimate among adults between 20 and 79 years has a relatively flat U-shaped relationship with age, even after controlling for all the covariates (Left Figure). This result contradicts an inverse U shape in previous hedonic studies based on limited adults under 65 and is consistent with a study focused on workers older than 50. Our result suggests that the elderly want to pay no less for public policy reducing mortality risks in the early pandemic stage, even after controlling for subjective baseline risks and objective health conditions, which aligns with Krupnick's (2007) policy recommendation. Third, we find a positive association between mean VSL and subjective baseline risk of dying from the early stage of Covid-19, even though we find no association between subjective baseline risk and age. Fourth, loss-seeking, present-biased, and prosocial participants are positively associated with VSL for the intensive margin. Risk-averse, present-biased, and selfish participants are negatively related to positive VSL for the extensive margin. This result indicates that prosociality is positively associated with WTP for public policy reducing mortality risk in society. Education in years, income, higher subjective baseline risk than the Japanese average, and subjective 30-year life expectancy are positively associated with VSL. Both objective and subjective health statuses are not significantly associated with VSL. Finally, our novel WTP elicitation method shows that the information gained from each choice is large in the early rounds and decreases over the sequence of choices (Right Figure). The estimate of choice consistency increases as the number of rounds increases. These results suggest that the personalized series of questions efficiently approach precise estimates of underlying WTP.



Reference: Krupnick, 2007. Mortality-risk valuation and age: stated preference evidence. REEP.