Why Does VSL Differ in Public and Private Contexts?

○Ao Liu*, Yohei Mitani**

1. Introduction

The Value of Statistical Life (VSL) is widely utilized in cost-benefit analysis (CBA) for policymaking aimed at reducing fatality risks. A common method to derive VSL values is the stated preference (SP) method, which involves choice experiments or contingent valuation methods. Typically, risk reductions assessed through the SP method concern public goods, meaning the risk reductions benefit not only the individual respondents but also others within the population. Traditionally, VSL estimation has not distinguished between the public and private attributes of the goods or services presented in hypothetical scenarios. Consequently, there is a risk of double-counting VSL estimates in SP studies involving public goods. This occurs because altruistic respondents may state a higher willingness to pay (WTP), while selfish respondents may report a lower WTP, opting for a "free ride." This paper investigates the differences between VSL estimates for private versus public projects within the context of COVID-19 vaccine uptake. We aim to answer the following research questions: Are VSL estimates from private projects significantly different from those from public projects? Does altruism account for the observed differences?

2. Methodology and Data

We conducted an online survey experiment with a sample of 1,825 respondents in Japan in July 2022. Individual WTP was elicited using novel dynamically optimized sequential experiment-contingent valuation modules. Respondents were randomly assigned to either a public scenario or a private scenario. In the public scenario, the description stated that the beneficiaries of the policy could not be specified, but on average, 9 people per 100,000 population would benefit and survive. In the private scenario, respondents were asked whether they would be willing to pay for an individual measure to reduce their own risk of dying by a factor of 10. To measure altruism, we included both a hypothetical measure using the Global Preference Survey (Falk et al., 2018) and an incentivized measure through donation experiments. For the main estimation, we employed the following two-part model:

$$\begin{cases} I(WTP_i > 0) = \beta_0 + \beta_1 Altruism_i + \beta_2 Public + \beta_3 (Altruism_i \times Public) + X_i\gamma + \epsilon_i \\ log(WTP_i) = \beta_0 + \beta_1 Altruism_i + \beta_2 Public + \beta_3 (Altruism_i \times Public) + X_i\gamma + \epsilon_i \quad if\ WTP_i > 0 \end{cases}$$

* Division of Natural Resource Economics, Graduate School of Agriculture, Kyoto University, Kyoto 606-8502, Japan. Email: liu.ao.72w@st.kyoto-u.ac.jp

** Division of Natural Resource Economics, Graduate School of Agriculture, Kyoto University, Kyoto 606-8502, Japan

3. Results

Table 1 presents the results of the Blinder-Oaxaca decomposition, analyzing WTP by project type. We find a significant difference in WTP between public and private goods. The endowments component of the decomposition is notably small and not statistically significant, indicating minimal contribution to the overall WTP difference. In contrast, the coefficients component is substantial and significant, underscoring that the explanatory variables considerably influence the WTP disparity between public and private projects. Table 2 confirms a statistically significant variance in WTP for public versus private projects in the two-part model. After controlling altruism, respondents exhibit a higher WTP for private projects. Furthermore, measures of altruism derived from GPS data and donation experiments show a significant and positive impact on the extensive margin, suggesting that altruistic individuals are more inclined to increase their payments in both contexts. Additionally, the interaction term (DonationA * Pub) in the intensive margin is also positive and significant, indicating that altruistic individuals are more likely to contribute to public rather than private projects.

Table1 Blinder-Oaxaca Decomposition by Pub

VSL	Coefficient	Std. err.	z	P>|z|	P>z
group_1	1.06e+05	11552.030	9.170	0.000	83251.520
group_2	78543.750	5296.075	14.830	0.000	68163.640
difference	27349.330	12708.180	2.150	0.031	2441.758
endowments	110.680	2451.376	0.050	0.964	-4693.929
coefficients	29132.890	12711.030	2.290	0.022	4219.731
interaction	-1894.237	3921.239	-0.480	0.629	-9579.723

Table2 Two-part model estimation results

	(1) WTP>0	(2) WTP>0	(3) log_VSL	(4) log_VSL
Pub	-.504**	-.469**	-.341***	-.256**
	(.242)	(.237)	(.111)	(.12)
altruism_GPS	-0.0002		.002***	
	(.001)		(.001)	
altruism_GPS * Pub	.002		0.00008	
	(.002)		(.001)	
DonationA		.034		.086***
		(.052)		(.025)
DonationA * Pub		.141**		-.02
		(.063)		(.028)
patience_GPS	.017**	.023***	-.005	-.005
	(.008)	(.008)	(.004)	(.004)
risk_GPS	.083***	.076***	.033***	.034***
	(.026)	(.025)	(.012)	(.012)
Demographics	Included	Included	Included	Included
Health Conditions	Included	Included	Included	Included
_cons	.71	.517	9.445***	9.236***
	(1.222)	(1.198)	(.634)	(.625)
sigma			1.495***	1.497***
			(.027)	(.026)
Observations	1759	1825	1555	1603
Pseudo R^2	.075	.102	.z	.z

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

4. Conclusion

Our study investigates the influence of altruism on both the intensive and extensive margins of the VSL from a SP perspective. We find that altruism significantly enhances the reported WTP. The intuition of "free ride" is consistent with our regression results. However, these findings do not fully explain why the average WTP is higher in a private context compared to a public one. The results from the Oaxaca-Blinder decomposition suggest the presence of different mechanisms influencing respondent behaviors across various contexts. Further investigation into these combined effects may provide deeper insights and is a recommended direction for future research.

Reference

Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., & Sunde, U. (2018). Global evidence on economic preferences. *Quarterly Journal of Economics,* 133 (4), 1645–1692.