

Information Intervention and Subjective Assessment of COVID-19 Risks in Japan: August 2023 Study

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Research purposes

- Gain insights into the effect of information provision by various entities on subjective risk assessment

What we do

- We conduct a large-scale survey to investigate the subjective assessments of COVID-19 risks in Japan.
- We divided subjects three type when pre-intervention based on the presence of the question and the nominal anchor, and five type when intervention based on the type of additional information given.
- We compare subjective risk before and after the information intervention and assess the degree of change.
- We uncover the factors associated with the subjective risk and its increase or decrease through multivariate logistic regression analysis.

Key results

- Providing basic statistics about COVID-19 a year ago significantly reduces prior subjective probability.
- Providing basic statistics about COVID-19 in the very recent past does not significantly affect posterior subjective probability in a robust way.
- None of the additional information (Tokyo, Okinawa, Expert, Government) significantly affects posterior subjective risk in a robust way.
 - This results is in a sharp contrast to those from the April 2023 survey.
 - In the April 2023 survey, some information significantly altered subjective risks.
 - One possible interpretation is that the classification of COVID-19 into 5-rui in May 2023 altered the public's sensitivity to information about COVID-19 risks.

Literature

➤ COVID-19 risk perceptions

- Japan: Adachi et al. (2022), Sato et al. (2023)
- Other countries: Cipolletta et al. (2022), Dryhurst et al. (2020), Dyer et al. (2022), Wise et al. (2020), etc.

➤ Risk perception and COVID-19 preventive behavior

- Bruine De Bruin & Bennett (2020), Bundorf et al. (2023); Garfin et al. (2021); Savadori & Lauriola (2022)

➤ Few studies compare the perceived and actual risks

- Abel et al. (2021), Akesson et al. (2022), Graso (2022)

➤ Scarcity of research on subjective risk assessment in the post-COVID era

Design of the survey

- Country: Japan
- Period: August 14 to August 28, 2023.
- Target: Men and women aged 20 and older nationwide
- Number of valid responses: 15,000
- Nationally representative: Distributions in age, gender, and place of residence was matched to those in the 2020 Population Census
- Ethic approval number (University of Tokyo) : 23-221
- Data sources:
 - Population of Japan – Statistics Bureau of Japan
 - Newly confirmed and death cases – Ministry of Health, Labour and Welfare

Survey questions - Perception of COVID-19 risks (1/4)

- We inquired about:

- Subjective probability of contracting COVID-19 within the next month
- Response options: (1) less than 0.001%, (2) 0.001% – 0.01%, (3) 0.01% – 0.1%, (4) 0.1% – 1%, (5) 1% – 5%, (6) 5% – 10%, (7) 10% – 20%, (8) 20% or higher.

Survey questions - Perception of COVID-19 risks (2/4)

- The first stage (Nominal Anchor and Prior Elicitation):
 - One-third of subjects were not presented with the number of infections and infection rates a year ago and not inquired about prior subjective probability. (No Nominal Anchor and No Prior Elicitation)
 - One-third of subjects were not presented with the number of infections and infection rates a year ago and inquired about prior subjective probability. (No Nominal Anchor and Prior Elicitation)
 - One-third of subjects were presented with the number of infections and infection rates a year ago and inquired about prior subjective probability. (Nominal Anchor and Prior Elicitation)

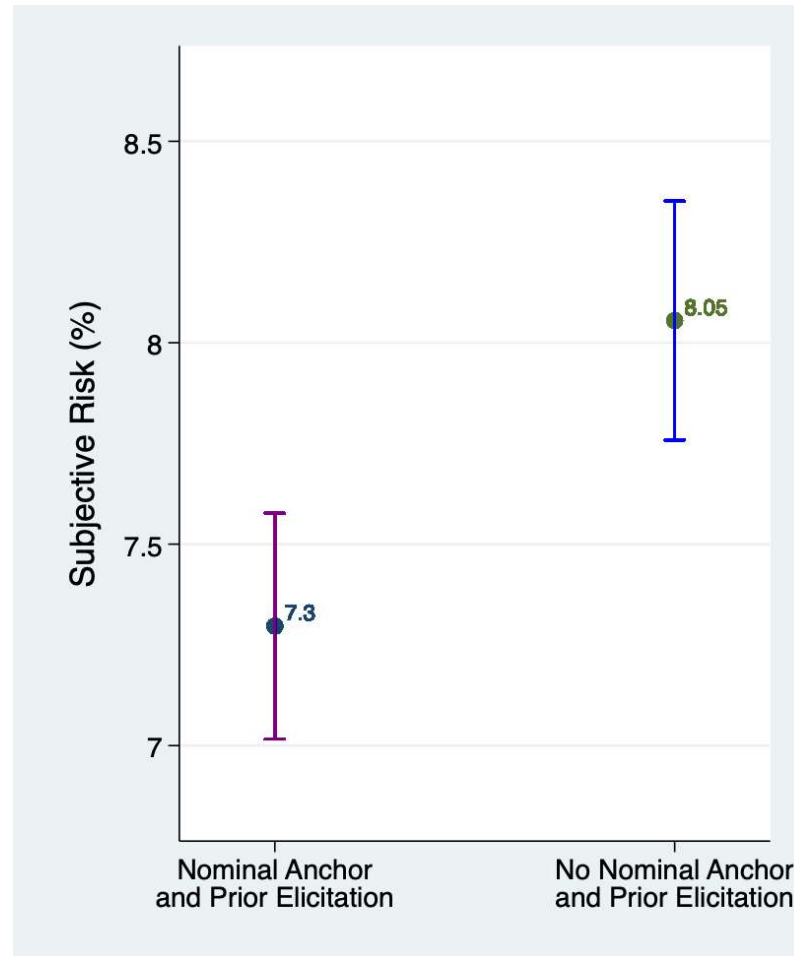
Survey questions - Perception of COVID-19 risks (3/4)

- The second stage (Information Intervention):
 - General Information : The reclassification, the number of infections and infection rates in April 2023 and the recent situation about COVID-19
 - Additional Information :
 - No additional information
 - Comment by a clinic in Tokyo about the potential collapse of the medical system
 - Press conference by a hospital in Okinawa about the potential collapse of the medical system
 - Comment by a COVID-19 expert that the spread of infection will likely continue
 - Statement by a government official that we are currently not in the middle of the ninth infection wave

Survey questions - Individual characteristics (4/4)

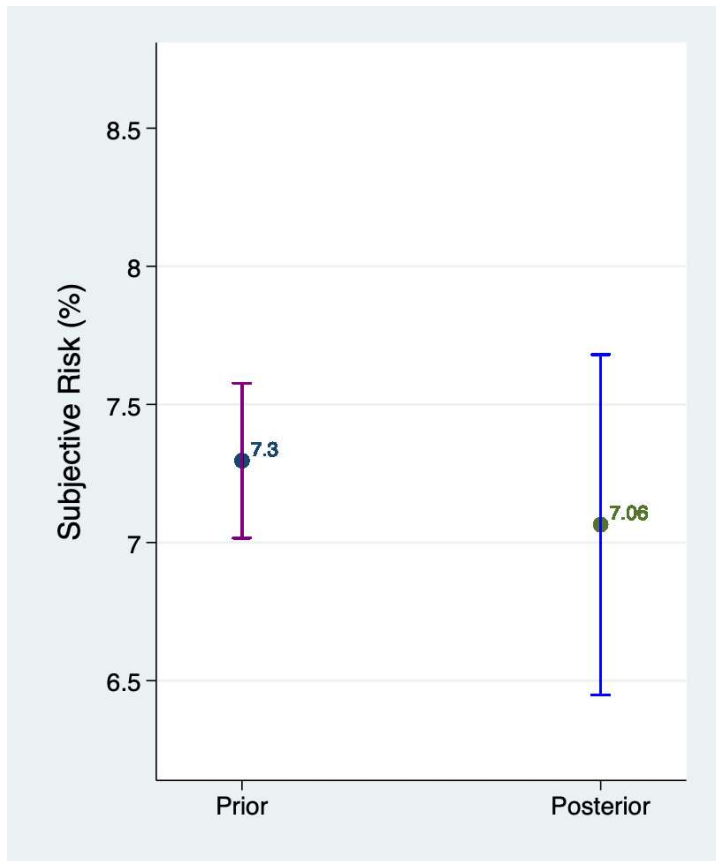
- Basic information: age, gender, place of residence, education level, income class
- Attributions:
 - Male: 49.5%, Female: 50.5%;
 - Age groups: 20s-30s: 28.3%, 40s-50s: 37.4%, Over 60s: 34.3%
- Health situation: medical history of chronic diseases
- COVID-19-related experiences: vaccination status, number of past infections, acquaintances' COVID-19-related deaths
- Primary media source (e.g., television, newspaper, internet, SNS, or others)

The Effect of Nominal Anchor on Prior Subjective Risk

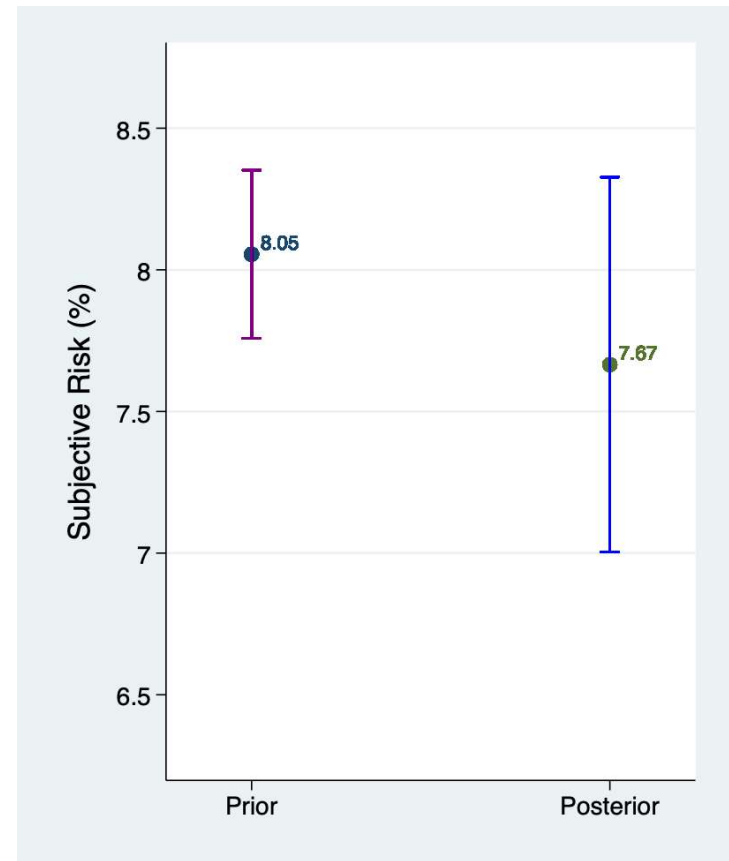


The Effect of General Information on Posterior Subjective Risk

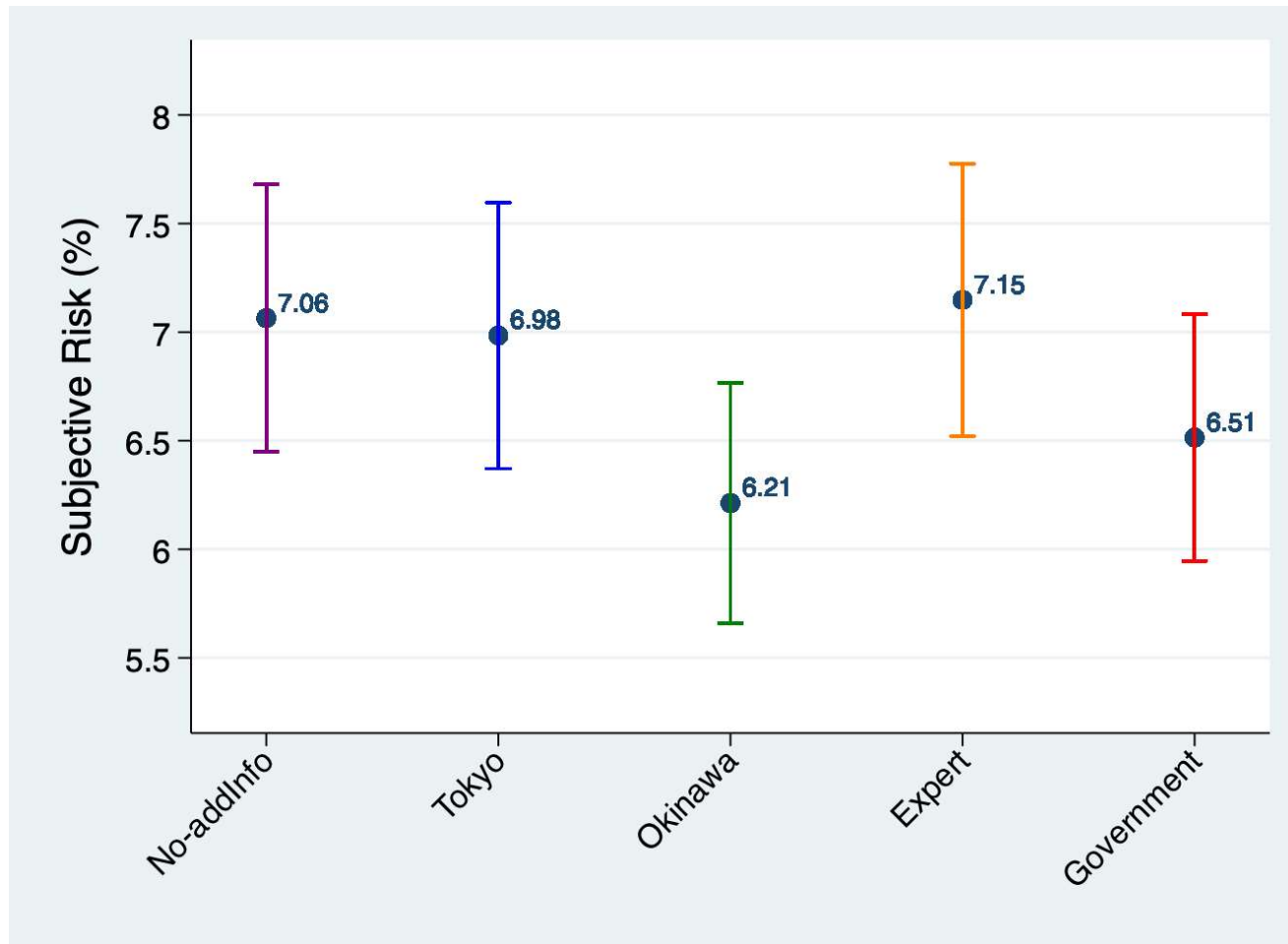
Nominal Anchor and Prior Elicitation



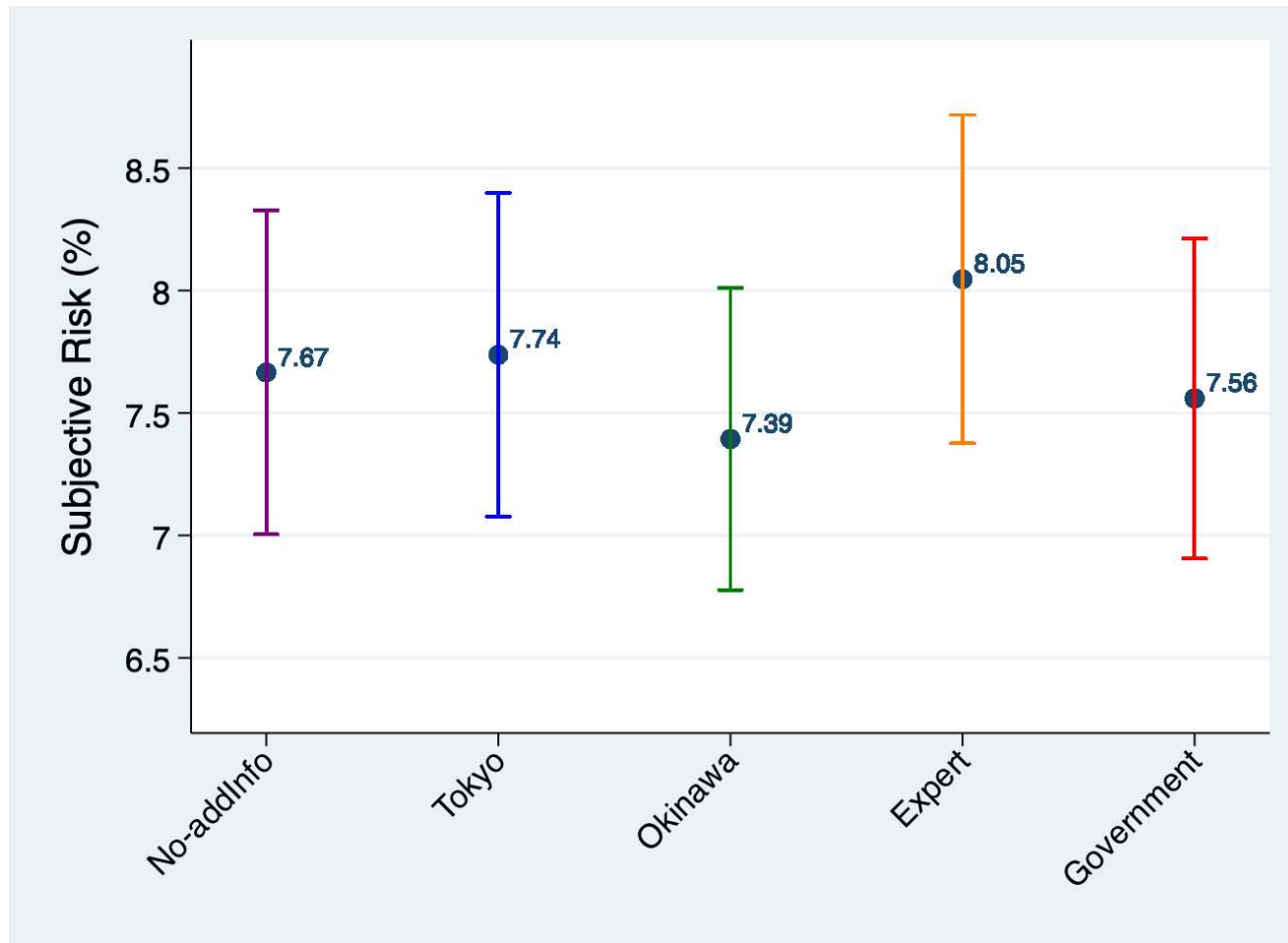
No Nominal Anchor and Prior Elicitation



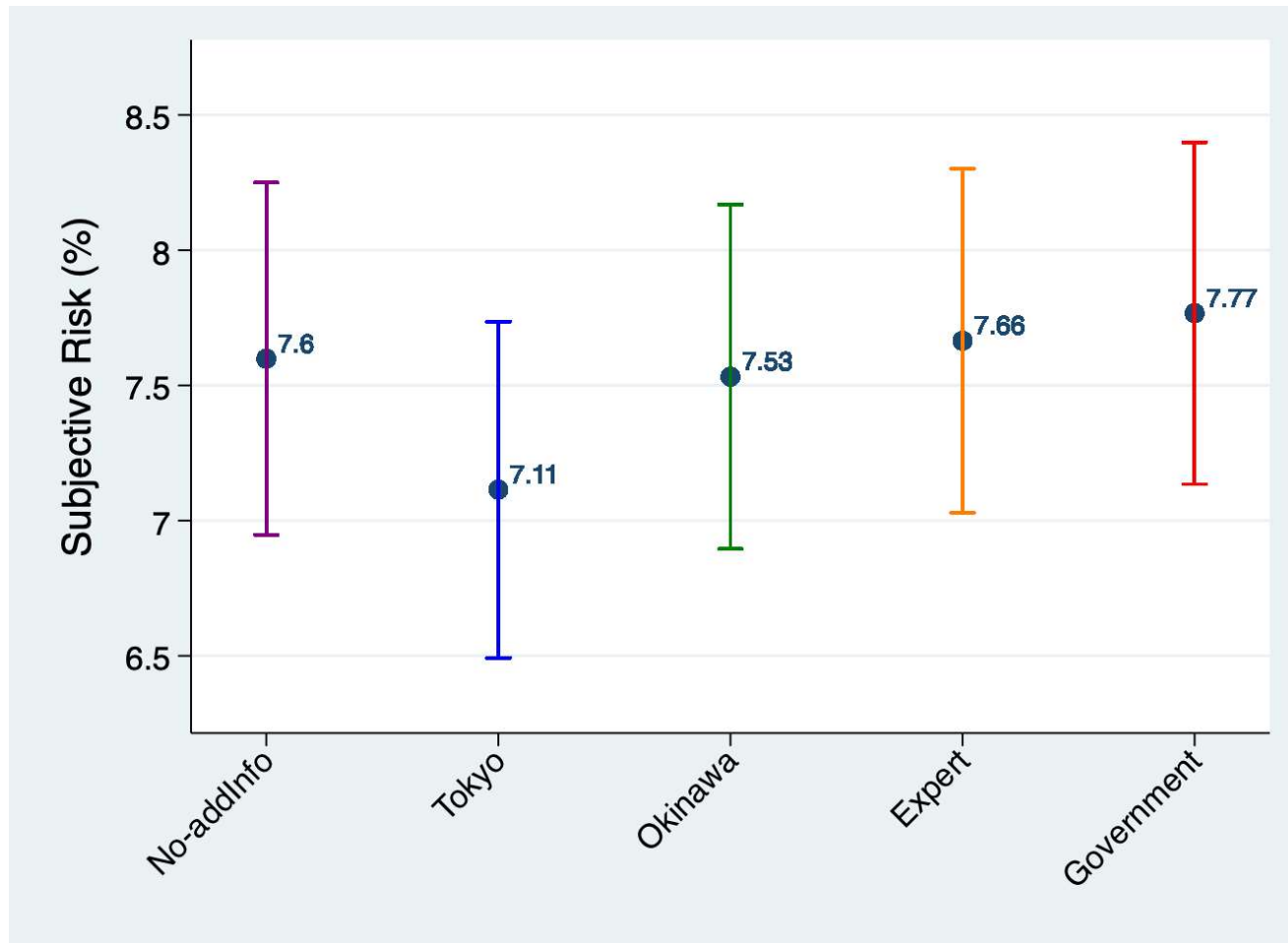
The Effect of Information Provision (Nominal Anchor and Prior Elicitation)



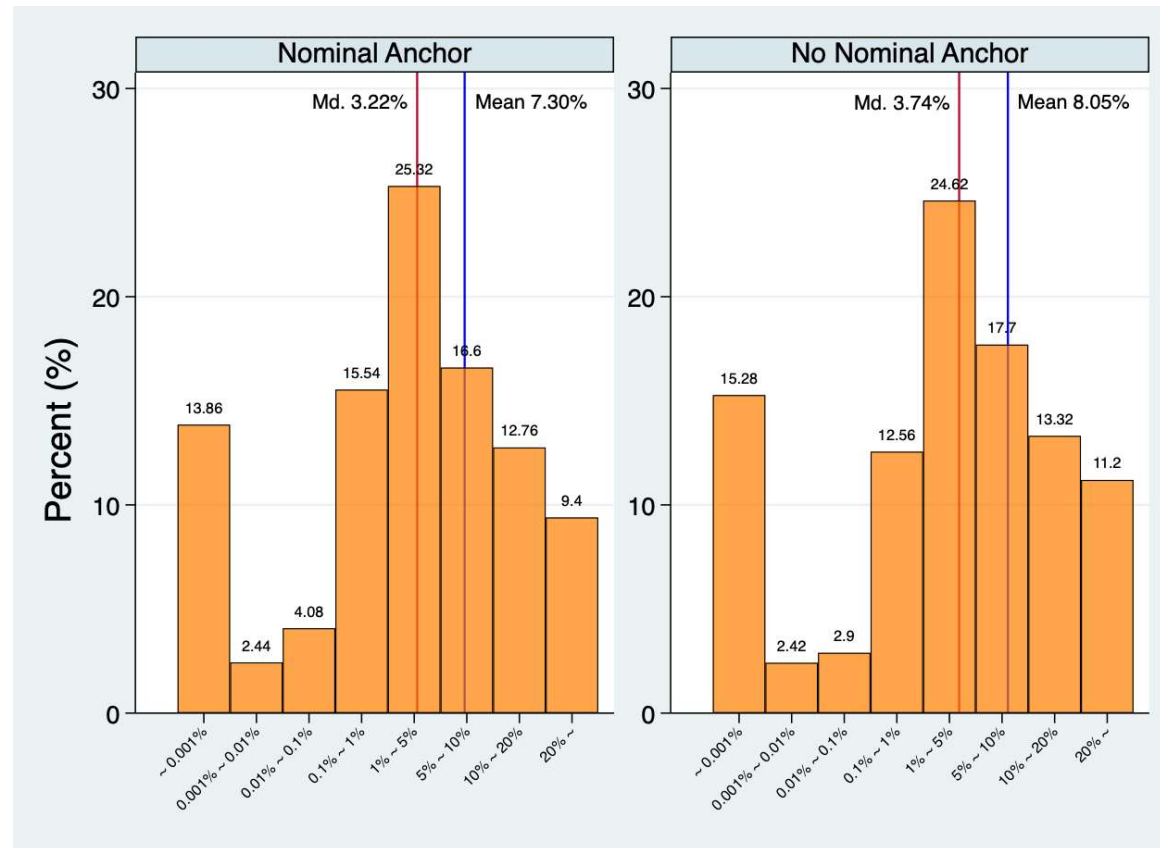
The Effect of Information Provision (No Nominal Anchor and Prior Elicitation)



The Effect of Information Provision (No Nominal Anchor and No Prior Elicitation)



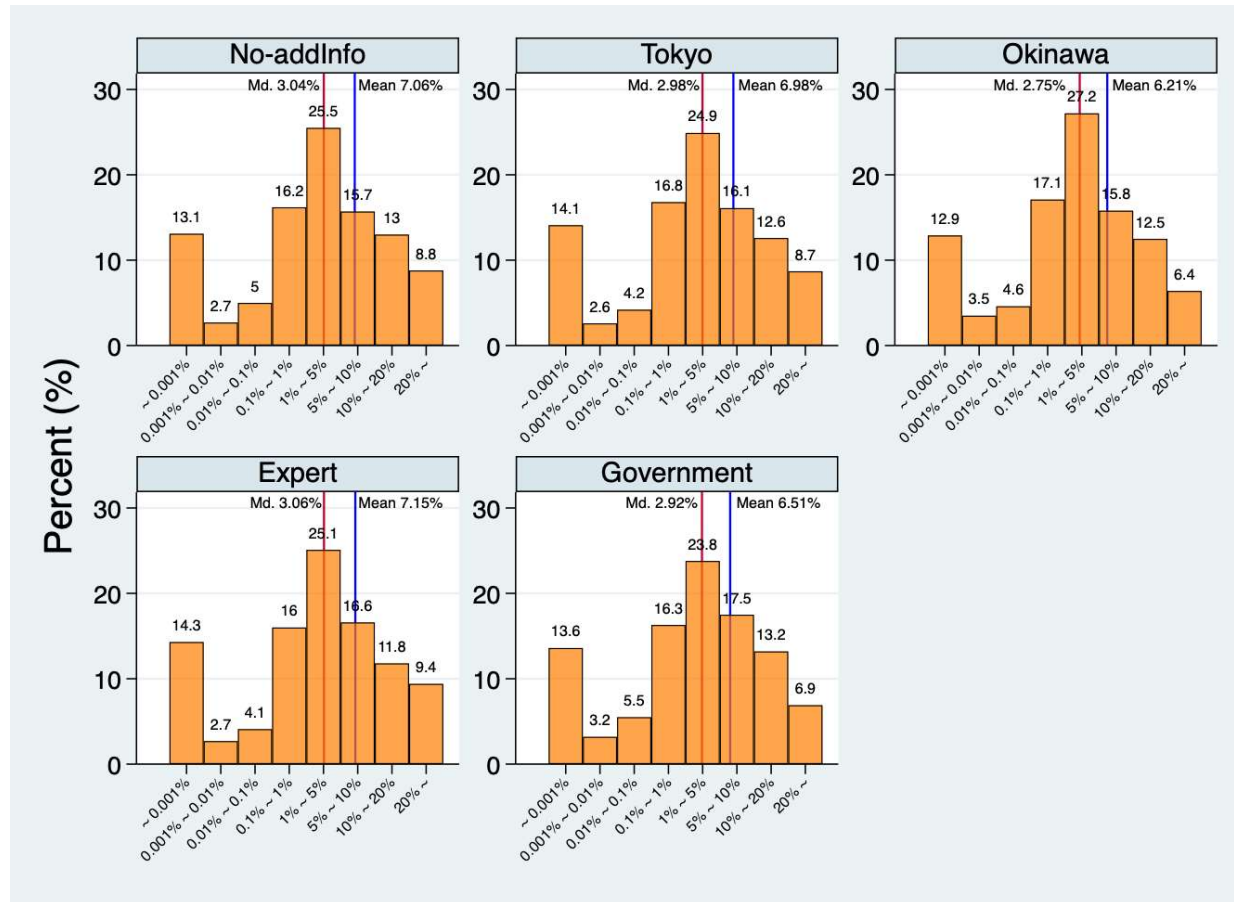
The Effect of Nominal Anchor on Prior Subjective Risk (Distribution)



Note: N(Each Sample) =5,000.

The Effect of Information Provision (Distribution)

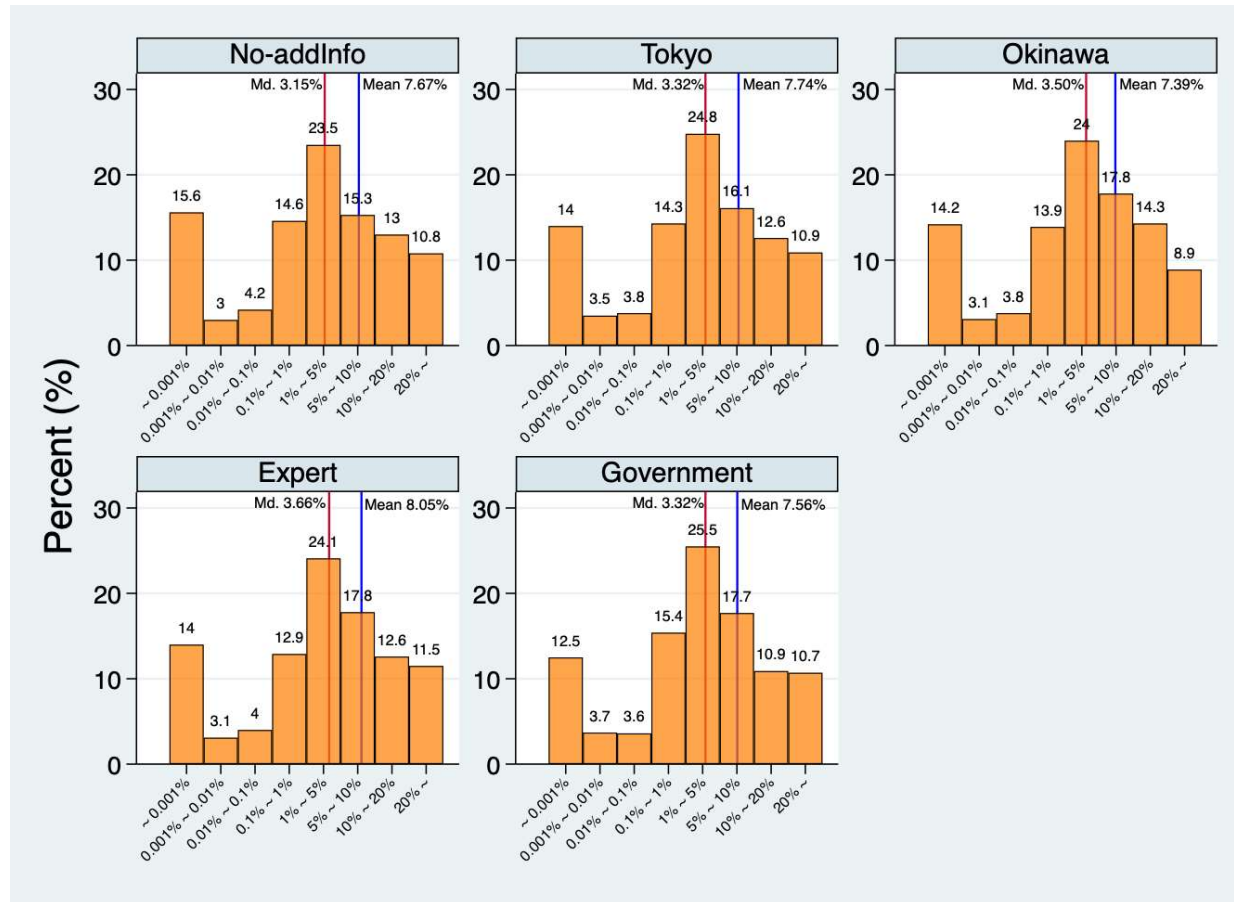
Nominal Anchor and Prior Elicitation



Note: N =5,000.

The Effect of Information Provision (Distribution)

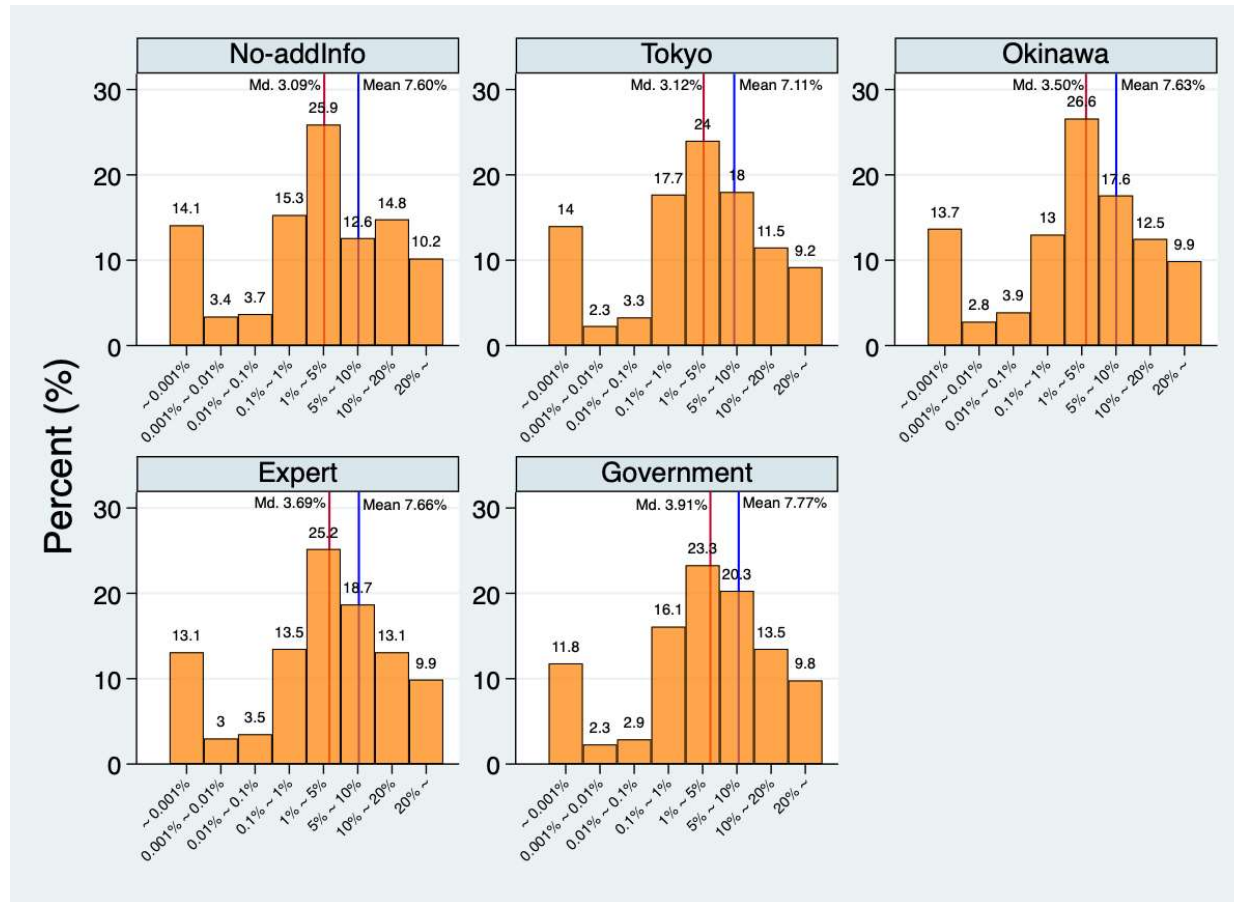
No Nominal Anchor and Prior Elicitation



Note: N =5,000.

The Effect of Information Provision (Distribution)

No Nominal Anchor and No Prior Elicitation



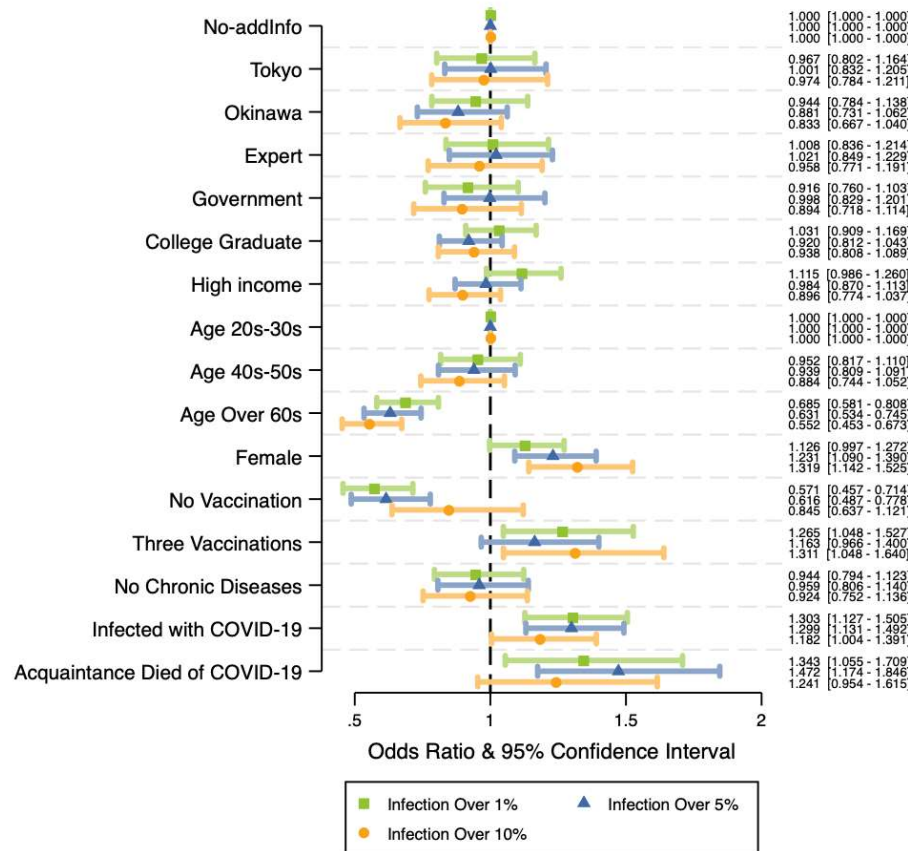
Note: N =5,000.

Multivariate Analysis

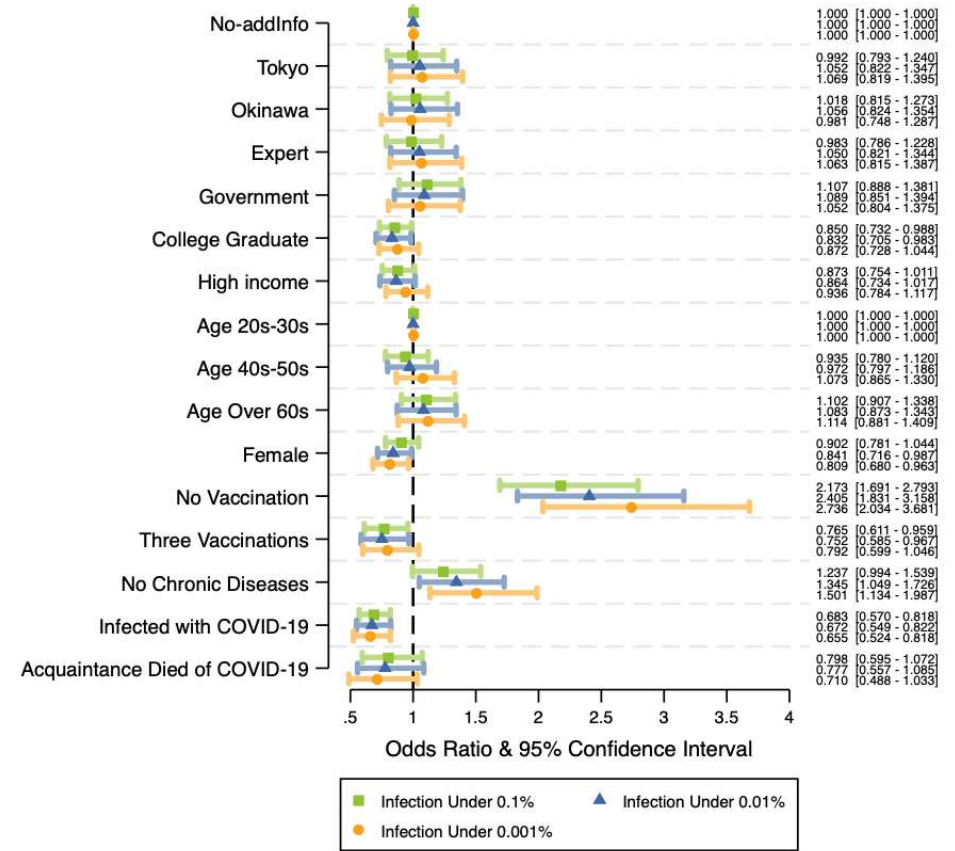
- Model: Logistic regression and Linear regression
- Outcome variables:
 - *Infection Over 1%, 5%, 10%*: equals 1 if the subjective risk of infection is equal to or higher than 1%, 5% or 10%.
 - *Infection Under 0.001%, 0.01%, 0.1%*: equals 1 if the subjective risk of infection is less than 0.001%, 0.01%, or 0.1%.
 - Probability of Infection
- Independent variables:
 - *College Graduate*: equals 1 if the person has a bachelor's degree or higher
 - *High Income*: equals 1 if the person has the income in 2022 from 4 million yen or more
 - Demographic factors (age group, gender)
 - Vaccination status, health situation
 - Proxies for COVID-19 related experiences (*Infected with COVID-19* and *Acquaintances Died of COVID-19*)
- Covariates:
 - Primary media source
 - Prefecture fixed effects

Determinants of risk overestimation / underestimation (Nominal Anchor and Prior Elicitation)

Overestimation



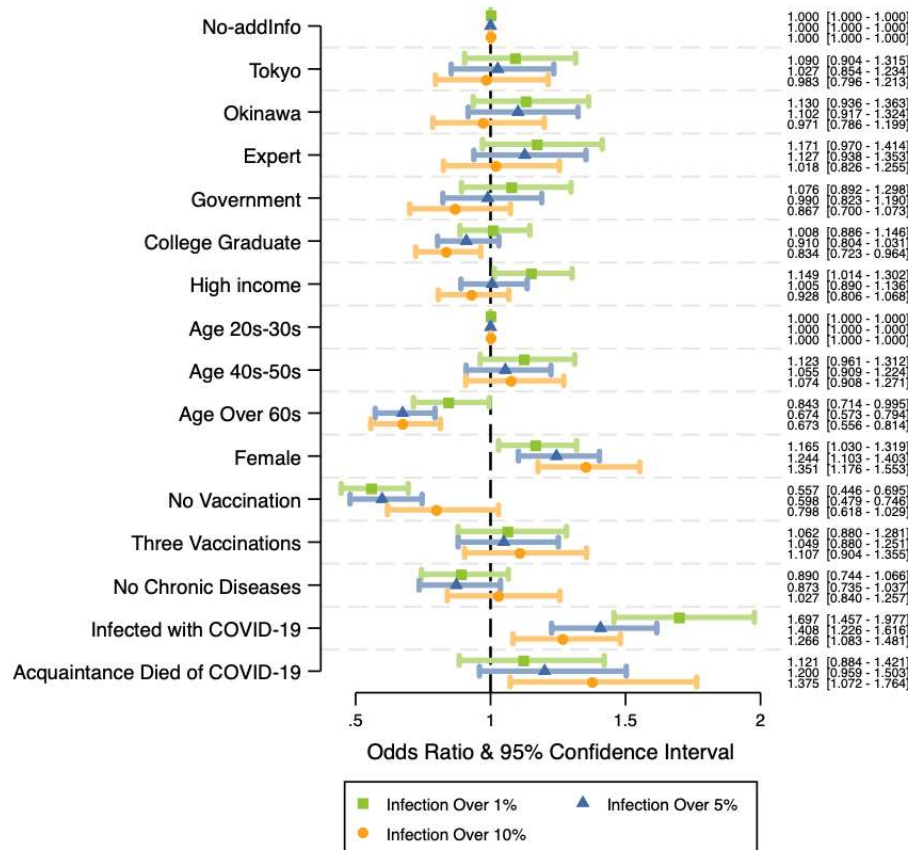
Underestimation



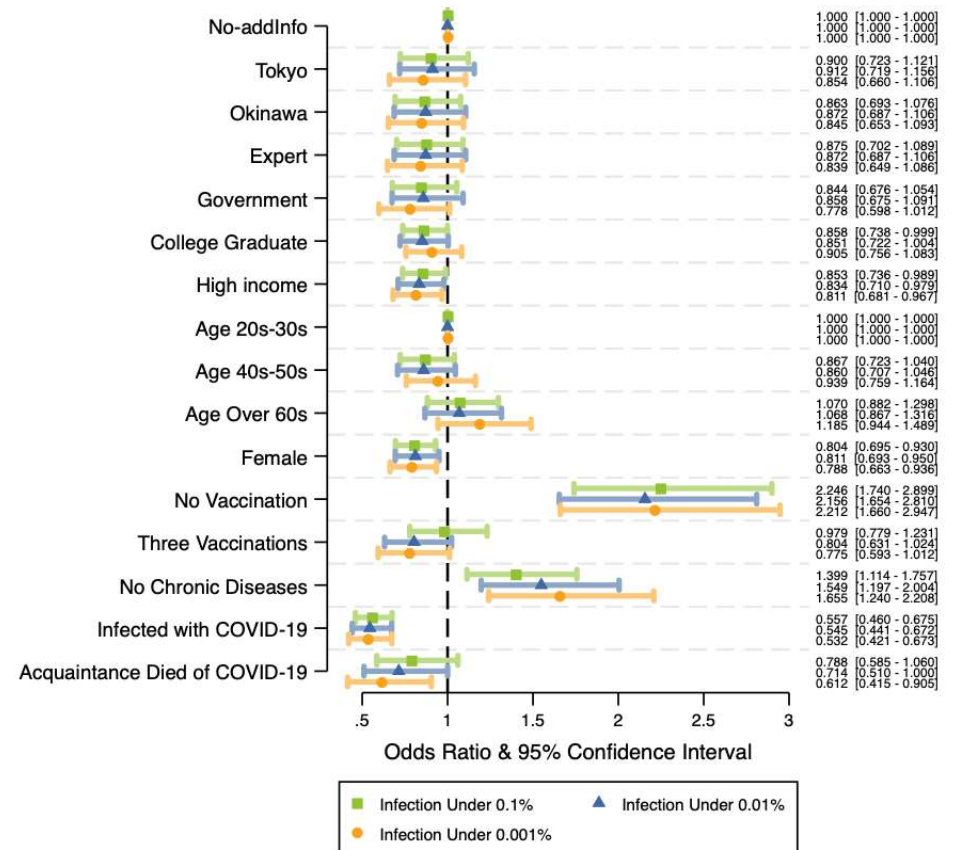
Note: N = 5,000. In the regressions, we also control for the media source and region fixed effects.

Determinants of risk overestimation / underestimation (No Nominal Anchor and Prior Elicitation)

Overestimation



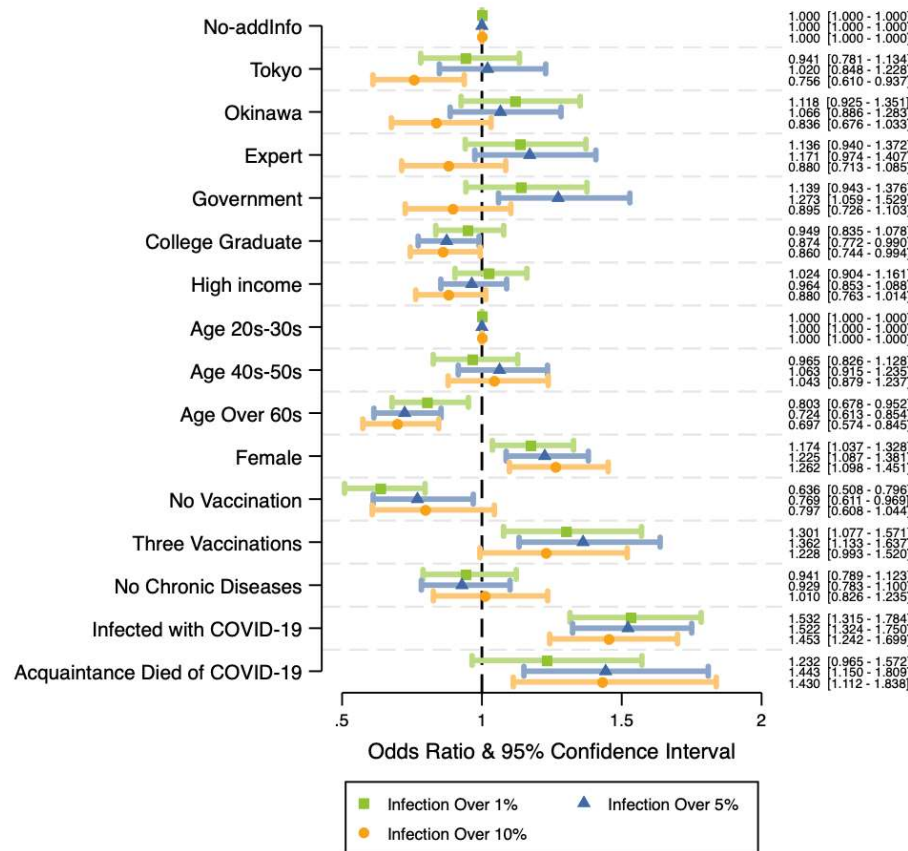
Underestimation



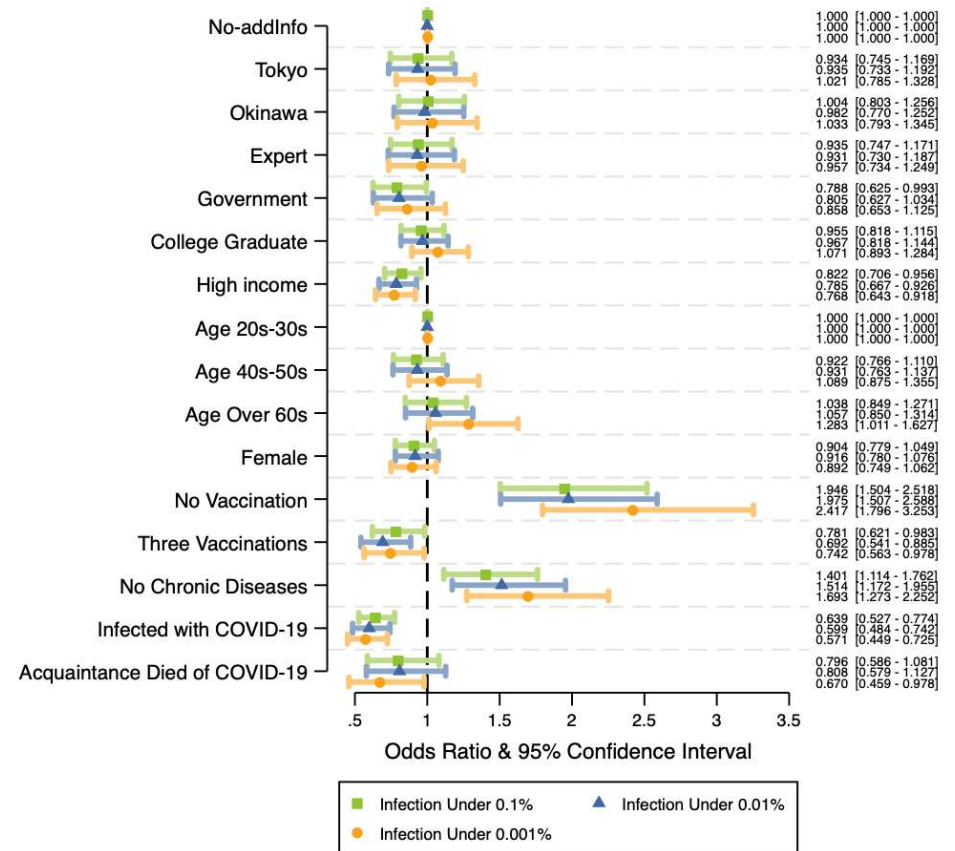
Note: N = 5,000. In the regressions, we also control for the media source and region fixed effects.

Determinants of risk overestimation / underestimation (No Nominal Anchor and No Prior Elicitation)

Overestimation

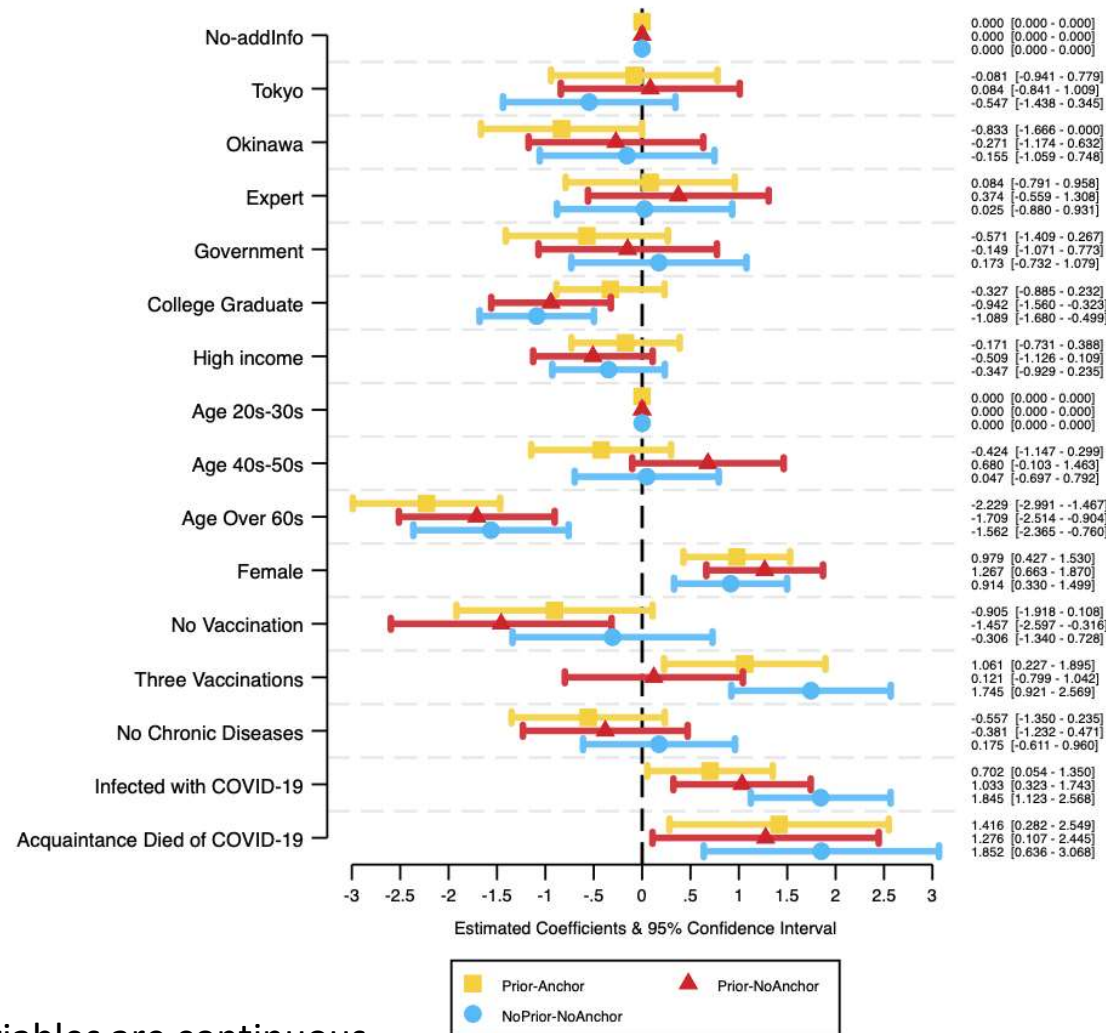


Underestimation



Note: N = 5,000. In the regressions, we also control for the media source and region fixed effects.

Probability of Infection : Linear Regression



Note: The outcome variables are continuous.

- *Probability of Infection* : the midpoints in responses about subjective risks.
- In the regressions, we also control for the media source and region fixed effects.

References

- Akesson, J., Ashworth-Hayes, S., Hahn, R., Metcalfe, R., & Rasooly, I. (2022). Fatalism, beliefs, and behaviors during the COVID-19 pandemic. *Journal of Risk and Uncertainty*, *64*(2), 147–190.
- Attema, A. E., L'Haridon, O., Raude, J., Seror, V., & The COCONEL Group. (2021). Beliefs and risk perceptions about COVID-19: Evidence from two successive French representative surveys during lockdown. *Frontiers in Psychology*, *12*, 619145.
- Bundorf, M. K., DeMatteis, J., Miller, G., Polyakova, M., Streeter, J. L., & Wivagg, J. (2023). Risk perceptions and private protective behaviors: Evidence from COVID-19 pandemic. *Review of Economics and Statistics*, 1–40.
- Dryhurst, S., Schneider, C. R., Kerr, J., Freeman, A. L. J., Recchia, G., Van Der Bles, A. M., ... Van Der Linden, S. (2020). Risk perceptions of COVID-19 around the world. *Journal of Risk Research*, *23*(7-8), 994–1006.
- Garfin, D. R., Fischhoff, B., Holman, E. A., & Silver, R. C. (2021). Risk perceptions and health behaviors as COVID-19 emerged in the United States: Results from a probability-based nationally representative sample. *Journal of Experimental Psychology: Applied*, *27*(4), 584–598.
- Sinclair, A. H., Hakimi, S., Stanley, M. L., Adcock, R. A., & Samanez-Larkin, G. R. (2021). Pairing facts with imagined consequences improves pandemic-related risk perception. *Proceedings of the National Academy of Sciences*, *118*(32), e2100970118.

Appendix

Key results: Infection Risk

- People aged 60 or older are less (or more) likely to have a very high (or very low) assessment of infection risk than others.
- People who have previously contracted COVID-19 are more (or less) likely to have a very high (or very low) assessment of infection risk.
- People without pre-existing chronic diseases are more (or less) likely to report a low (or high) infection risk.
- People without vaccination are more (or less) likely to report a very low (or very high) infection risk.

Infection risk perception by Nominal Anchor: Overestimation / Underestimation

Subjective Infection Rate	Group		
	Nominal Anchor and Prior Elicitation	No Nominal Anchor and Prior Elicitation	No Nominal Anchor and No Prior Elicitation
Overestimation			
More than 1%	32.42%	33.59%(*)	33.99%(*)
More than 5%	31.49%	34.20%(*)	34.31%(*)
More than 10%	30.94%	34.80%(*)	34.26%(*)
Underestimation			
Less than 0.1%	34.23%	34.23%	31.55%
Less than 0.01%	33.09%	34.69%	32.21%
Less than 0.001%	33.17%	34.29%	32.54%

Infection risk perception by additional Information: Overestimation / Underestimation

Subjective Infection Rate	Provided Additional Information				
	No-addInfo	Tokyo	Okinawa	Expert	Government
Overestimation					
More than 1%	19.68%	19.71%	20.14%	20.38%	20.10%
More than 5%	19.44%	19.69%	19.69%	20.66%	20.51%
More than 10%	21.14%	19.62%	19.32%	20.46%	19.47%
Underestimation					
Less than 0.1%	20.90%	19.94%	20.16%	19.94%	19.06%
Less than 0.01%	20.77%	20.21%	20.09%	20.09%	18.85%
Less than 0.001%	20.88%	20.54%	19.90%	20.20%	18.49%

Infection risk perception by age group: Overestimation / Underestimation

Subjective Infection Rate	N	Age Group		
		20s-30s	40s-50s	Over 60s
Overestimation				
More than 1%	9,609	28.49%	38.67%	32.83%(*)
More than 5%	5,875	29.72%	40.34%	29.94%(*)
More than 10%	3,339	30.97%	41.03%	28.00%(*)
Underestimation				
Less than 0.1%	3,100	30.81%	34.81%(*)	34.39%(*)
Less than 0.01%	2,499	31.61%	35.01%(*)	33.37%(*)
Less than 0.001%	2,050	30.15%	36.10%	33,76%

References

- Dryhurst, S., Schneider, C. R., Kerr, J., Freeman, A. L. J., Recchia, G., Van Der Bles, A. M., Spiegelhalter, D., & Van Der Linden, S. (2020). Risk perceptions of COVID-19 around the world. *Journal of Risk Research*, 23(7–8), 994–1006.
- Dyer, M. L., Sallis, H. M., Khouja, J. N., Dryhurst, S., & Munafò, M. R. (2022). Associations between COVID-19 risk perceptions and mental health, wellbeing, and risk behaviours. *Journal of Risk Research*, 25(11–12), 1372–1394.
- Garfin, D. R., Fischhoff, B., Holman, E. A., & Silver, R. C. (2021). Risk perceptions and health behaviors as COVID-19 emerged in the United States: Results from a probability-based nationally representative sample. *Journal of Experimental Psychology: Applied*, 27(4), 584–598.
- Graso, M. (2022). The new normal: Covid-19 risk perceptions and support for continuing restrictions past vaccinations. *PLOS ONE*, 17(4), e0266602.
- Sato, M., Kinoshita, S., & Ida, T. (2022). Subjective Risk Valuation and Behavioral Change: Evidence from COVID-19 in the U.K. and Japan (e-22-011). Graduate School of Economics, Kyoto University.
- Savadori, L., & Lauriola, M. (2022). Risk perceptions and COVID-19 protective behaviors: A two-wave longitudinal study of epidemic and post-epidemic periods. *Social Science & Medicine*, 301, 114949.
- Wise, T., Zbozinek, T. D., Michelini, G., Hagan, C. C., & Mobbs, D. (2020). Changes in risk perception and self-reported protective behaviour during the first week of the COVID-19 pandemic in the United States. *Royal Society Open Science*, 7(9), 200742.