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COVID-19 and economic preferences: Evidence from a panel of cab drivers☆

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ABSTRACT

This paper studies the impact of the COVID-19 pandemic on risk and time preferences. Using a longitudinal dataset from a survey of cab drivers in Lima (Peru), we document a significant increase in risk tolerance and patience. The changes are heterogeneous and monotonic by age: older cohorts become more risk-taking while younger ones become more patient. Our findings suggest that the pandemic could have affected individuals' behavior and socioeconomic outcomes via another channel, namely, changes in economic preferences.

1. Introduction

A substantial body of evidence finds that economic preferences are not stable but may be affected by shocks and life events such as illness, natural disasters, or civil war, among others.[1] Given the severe disruption caused by the COVID-19 pandemic, several studies have started to examine its impact on economic preferences. Answering this question is important to understand better the short and long-run socioeconomic impacts of the pandemic. The existing evidence is, however, inconclusive. Some studies report no effects, while others find significant changes but with mixed signs (some positive, others negative).[2]

This paper examines the impact of the COVID-19 pandemic on risk and time preferences. Our main contribution is to use a new longitudinal dataset of cab drivers in Lima (Peru). Our data has a wider age range than most current studies, which focus on young individuals, usually university students. This feature allows us to examine heterogeneous effects by age. This issue is relevant to assess, given that the pandemic could have affected younger and older individuals differently. For instance, the risk of severe illness and death was higher for older individuals, while younger cohorts may have been more affected by the disruption of social and economic activities.

Our dataset comprises individuals (mostly men) with ages ranging from 20 to 68 years old. We interview them in mid-2019 and late 2020-early 2021, almost one year after the onset of the pandemic. We construct measures of risk and time preference using the same methodology as the Global Preference Survey, a widely-used dataset of economic preferences (Falk et al., 2018). The methodology is based on survey questions but has been validated using incentivized experiments. Similar to recent studies on the impact of the pandemic on preferences,

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[1] For a review of the literature on stability of preferences see Akesaka (2019), Aragón, Molina, and Outes-León (2020), Brown, Montalva, Thomas, and Velásquez (2019), Carvalho, Prina, and Sydnor (2016), Chuang and Schechter (2015), Hanaoka, Shigeoka, and Watanabe (2018), Jakiela and Ozier (2019), Malmendier and Nagel (2011), Schildberg-Hörisch (2018), Voors et al. (2012) and Kim and Lee (2014) and references therein.

[2] For a survey on the literature on the socioeconomic impact of the COVID-19 pandemic, see Brodeur, Gray, Islam, and Bhuiyan (2021). For studies on the impact of the pandemic on economic preferences, see Drichoutis and Nayga (2021), Harrison et al. (2022), Ikeda, Yamamura, Tsutsui, et al. (2023), Lohmann, Gsottbauer, You, and Kontoleon (2020), Shachat, Walker, and Wei (2021b) and Alsharawy, Ball, Smith, and Spoon (2021) and references therein.

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our identification strategy exploits time-variation and panel data to examine changes in measures of preferences for a given individual over time.

We find evidence of a significant increase in risk-taking and patience. The effects are sizable, heterogeneous, and monotonic on age. In the case of risk-taking, the change among younger cohorts is negligible but increases with age and becomes quite sizeable among older cohorts (0.36 standard deviations). We observe the opposite pattern for patience: an increase among younger cohorts (0.3 standard deviations) and no change for older individuals.

These heterogeneous results have not been documented before. They are, however, useful to better understand how the pandemic could have affected the preferences of a broad population. They might also explain the lack of significant effects on risk aversion reported in some studies that use samples of young individuals.

2. Methods

Data source. We use panel data from a survey collected by the research team in Lima metropolitan area from a sample of cab drivers. The baseline survey was collected in May 2019 using in-person interviews. We conducted a follow-up phone survey from December 2020 to mid-February 2021.

The original panel dataset consists of 1282 individuals. The survey, however, was collected as part of a randomized control trial on the effect of a saving product. To avoid confounding our results with this intervention, we focus on the randomly selected control group.[3] This group represents a third of the original sample (n = 416).

Measuring economic preferences. We construct survey-based measures of risk-taking and patience at the individual level. We follow the same methodology as the Global Preference Survey (GPS). This methodology is based on non-incentivized survey questions and has been validated using incentivized experiments (Falk et al., 2018).

We elicit an individual's preferences by combining two sets of questions.[4] First, we ask the respondent a sequence of five hypothetical choices between a lottery and varying sure payments (or between immediate and delayed financial rewards in the case of time preferences). The value of the sure (delayed) payments varies according to a 'staircase' procedure that increases or decreases the amount according to previous choices. This procedure allows us to zoom in on the respondents' point of indifference. Second, we ask respondents to self-assess their willingness to take risks (or delay payment) using a 0–10 scale.

We combine the information from the two sets of questions into an index by taking a weighted average of the normalized values (z-scores).[5] The z-scores are obtained using the mean and standard deviation in the baseline period.

Fig. 1 displays the distributions of our two measures of economic preferences in the baseline (pre-pandemic) and follow-up (post-pandemic) surveys. In both cases, we observe a rightward shift of the distribution. This observation suggests an increase in risk-taking and patience.[6]

Life events and emotional states. We collect information on life events and emotional states to use as control variables. Based on previous studies, we focus on negative health, financial, and criminal events in the last 12 months.

Our measure of a negative health event is an indicator of the respondent or a household member having suffered a serious accident, illness, or died. We distinguish health events that are attributed to COVID-19 or not. We also include an indicator of the respondent reporting herself or a household member getting COVID-19 but not being ill. We interpret this response as a case of mild or asymptomatic COVID-19.

Our measure of a negative financial event is an indicator of any household member having experienced any of the following shocks: losing a job, closure or bankruptcy of a family business, reduction in labor income or working hours, or reduction of income from other sources. Finally, we create an indicator of any household member being a victim of theft or burglary.

We also collect two (self-reported) measures of an individual's emotional state: happiness and anxiety.[7] We construct indices normalizing these variables using the baseline mean and standard deviation.

Table 1 displays summary statistics for the whole sample and by age group.[8] There are some relevant observations. First, the majority of our sample is comprised of middle-aged men (age ranges from 20–68 years), of which less than half have tertiary education. Second, risk aversion seems to increase with age. Finally, the likelihood of life events and emotional states at the time of the survey seems to differ across age groups.

Identification strategy. We estimate the impact of the COVID-19 pandemic by comparing the preferences of a given individual after the onset of the pandemic to her preferences in an earlier period. Formally, we estimate the following first-difference panel data model:

$$\Delta y_i = \beta X_i + \gamma W_i + \epsilon_i, \tag{1}$$

where $\Delta y_i = y_{i,t} - y_{i,t-1}$ is the change in the measure of preference y (risk-taking or patience) of individual i, between the baseline $(t-1)$ and follow-up (t) periods. X_i are indicators of age group, and W_i are control variables such as indicators of having experienced a negative life event in the last 12 months, or the indexes of happiness and anxiety.

The parameter of interest in our baseline specification is β. This parameter identifies heterogeneous changes over time. Note that under the assumption that there are heterogeneous effects by age, our approach is equivalent to a difference-in-difference with two periods and individual fixed effects: $y_{it} = \alpha + \beta(X_i \times P_t) + \gamma(W_i \times P_t) + \eta_i + \varepsilon_{it}$, where α is a constant, P_t is an indicator of the follow-up period (treatment), X_i identifies treated and control groups, and η_i is an individual fixed effect.

Our identification strategy exploits time variation within individuals. This approach is similar to the strategy used in several studies on the impact of COVID-19 on preferences, such as Angrisani et al. (2020), Drichoutis and Nayga (2021) and Bäckman et al. (2020) or Adema, Nikolka, Poutvaara, and Sunde (2022). Similar to our approach, these studies also compare measures of economic preferences for the same individual before and during the pandemic, albeit they do not exploit between-individual differences in exposure to the shock. This panel data approach complements strategies that rely on repeated cross-sections by reducing concerns of biases due to changes in sample composition or unobserved time-invariant characteristics.

Our approach has two limitations. First, it bundles our measure of COVID-19 with all time-varying factors that could have influenced

[3] Our main results are, however, robust to including the two treatment arms and using the full sample.

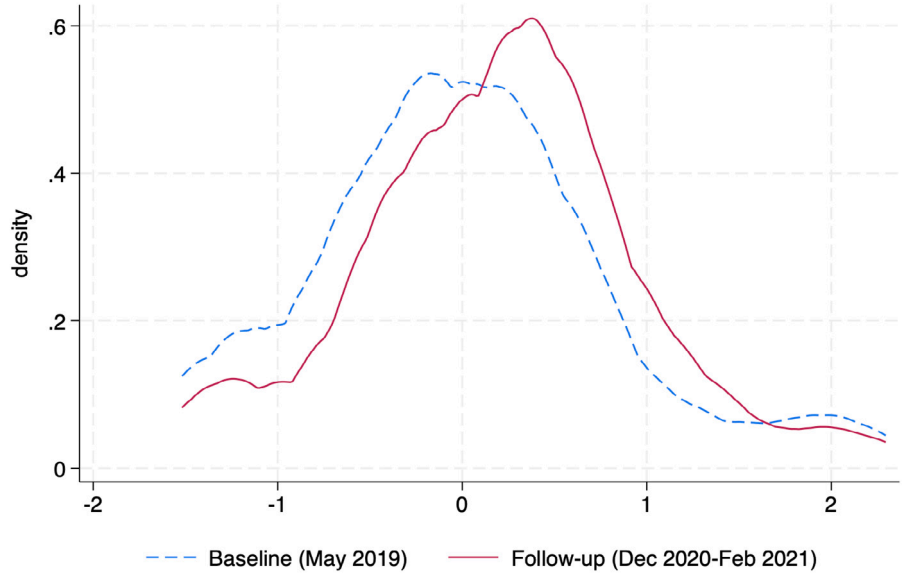
[4] See Appendix B for details on the survey questions. For additional information on the survey methodology and validity, see Falk et al. (2018), Falk, Becker, Dohmen, Huffman, and Sunde (2023).

[5] We use the same weights as the GPS, i.e., 0.5270015 and 0.2884815 for the self-assessment questions on risks and patience, respectively.

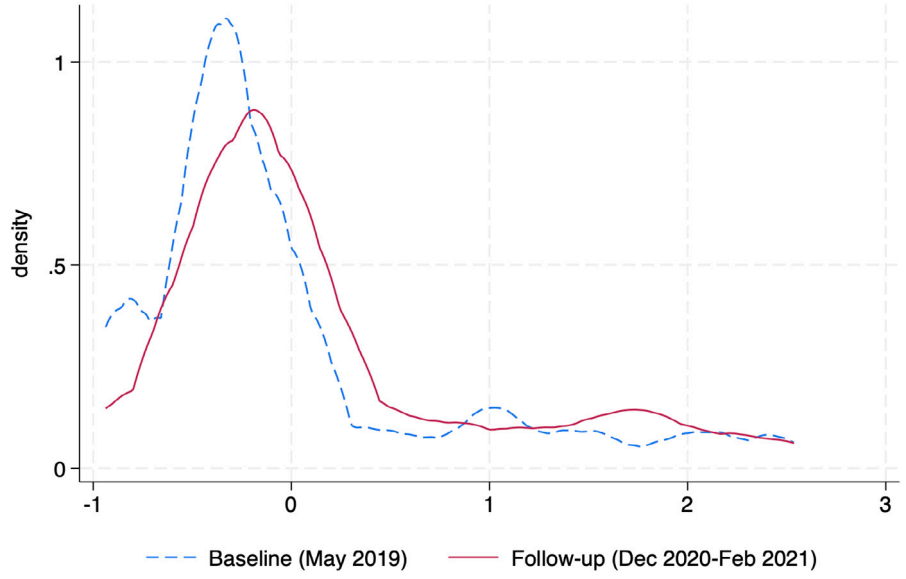
[6] The Kolmogorov–Smirnov test for equality of distributions confirms this observation. The p-value in both cases is 0.000.

[7] Individuals are asked: "On a scale from 0–10, how happy (anxious) were you yesterday?". These measures were collected in the baseline and follow-up surveys.

[8] For simplicity of exposition, we classify age by decades. Our results are, however, qualitatively similar if we use an alternative classification approach, such as quartiles.



(a) Risk-taking index



(b) Patience index

Fig. 1. Distribution of measures of economic preferences.

the measures of economic preferences. Thus it cannot disentangle the impact of different aspects of the pandemic, such as shifts in individuals' perceptions of health risks, increased economic adversity, and social distancing measures. At best, our estimates encompass the overall impact of the pandemic, including all the individual and aggregated changes triggered by it. Second, our identification strategy assumes that, conditional on the covariates, there was no other age-specific change in the environment that could have affected preferences.

3. Results

Table 2 display our main results. The main observation is that, for some age groups, there was a significant increase in both risk-taking and patience between 2019 and 2021 (columns 1 and 4). The magnitude of this increment is sizeable: between 0.20 to 0.40 standard deviations.

The changes are heterogeneous and monotonic by age. In the case of risk-taking, there is a large increase in risk-taking among individuals 50 years and older, but almost no change for individuals aged 20–29 years. In the case of patience, we observe an opposite pattern: a large increase for younger cohorts but no change for older ones. To better illustrate these heterogeneous effects, we depict the estimates of column 2 in Fig. 2. We observe that the magnitude of the change in preferences is monotonic on age: increasing in the case of risk-taking but decreasing for patience.

These heterogeneous effects have not been documented before. They are, however, useful to better understand the impact of the pandemic on preferences. Moreover, they could explain the lack of

Table 1
Summary statistics.

	All	Age group		
		20–29	30–49	50+
A. Socio-demographic characteristics				
Is female (%)	3.1	1.5	3.3	4.0
Age	39.8	27.0	38.1	57.2
Complete tertiary education (%)	47.1	36.9	47.1	56.0
Suffers chronic disease (%)	9.4	3.1	9.4	14.7
B. Measures of economic preferences				
Risk-taking index	0.0	0.099	0.026	−0.180
Patience index	0.0	−0.085	0.016	0.015
C. Self-reported life events and emotional states				
Mild or asymptomatic COVID-19	11.5	7.7	13.0	9.3
Negative health event (all causes0	13.7	15.4	12.3	17.3
Negative health event (due to COVID-19)	9.1	10.8	8.0	12.0
Negative financial event	58.9	76.9	54.7	58.7
Victim of theft or burglary	6.5	4.6	6.9	6.7
No. obs.	416	65	276	75

Notes: Variables in Panel A and B are from the baseline survey. Variables in Panel C are from the follow-up survey. "Suffers chronic disease" is an indicator of having a chronic condition such as asthma, high blood pressure, heart problems, HIV, cancer, depression, arthritis, stomach ulcer, or kidney disease.

Table 2
Change in economic preferences.

	Δ risk-taking index			Δ patience index		
	(1)	(2)	(3)	(4)	(5)	(6)
Age 20–29	0.060	−0.028	−0.028	0.294**	0.389**	0.386**
	(0.151)	(0.164)	(0.164)	(0.137)	(0.157)	(0.157)
Age 30–49	0.213**	0.148	0.148	0.167*	0.226**	0.225**
	(0.085)	(0.097)	(0.097)	(0.095)	(0.110)	(0.111)
Age 50+	0.448***	0.364***	0.364***	−0.010	0.052	0.050
	(0.118)	(0.134)	(0.134)	(0.130)	(0.142)	(0.142)
Negative health event (all causes)		0.319*			0.127	
		(0.166)			(0.156)	
Negative health event (due to COVID-19)			0.332*			0.077
			(0.184)			(0.167)
Negative health event (unrelated to COVID-19)			0.295			0.229
			(0.314)			(0.306)
Mild or asymptomatic COVID-19		0.002	0.005		0.116	0.102
		(0.148)	(0.150)		(0.163)	(0.164)
Negative financial event		0.055	0.055		−0.153	−0.150
		(0.108)	(0.107)		(0.106)	(0.105)
Victim of theft or burglary		−0.038	−0.038		−0.164	−0.161
		(0.153)	(0.152)		(0.189)	(0.188)
Observations	416	416	416	410	410	410
R-squared	0.058	0.070	0.070	0.054	0.062	0.062

Notes: Robust standard errors in parentheses. All regressions control for measures of the happiness and anxiety indexes collected in the follow-up survey, indicators of the month of the follow-up survey, and a full set of age group dummies.

* Denotes significant at 10%.

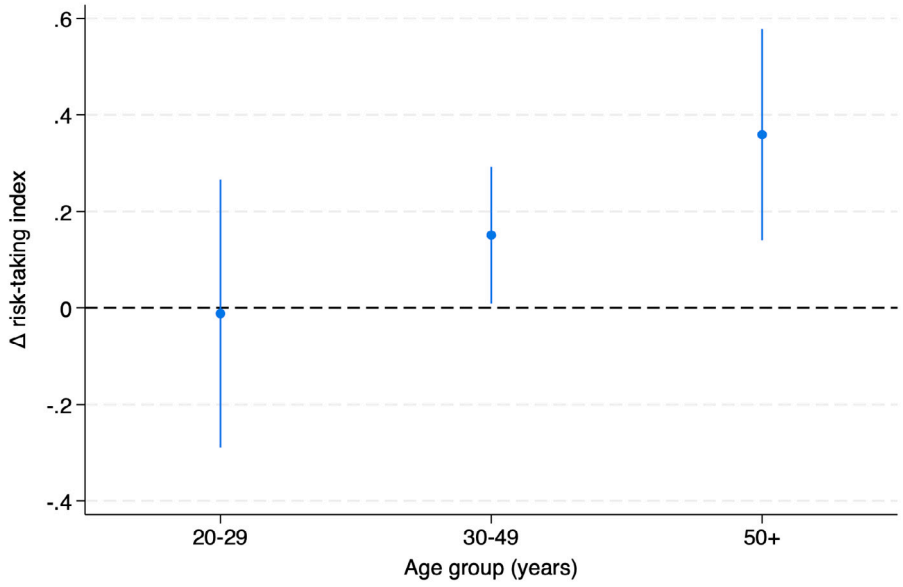
** Denotes significant at 5%.

*** Denotes significant at 1%.

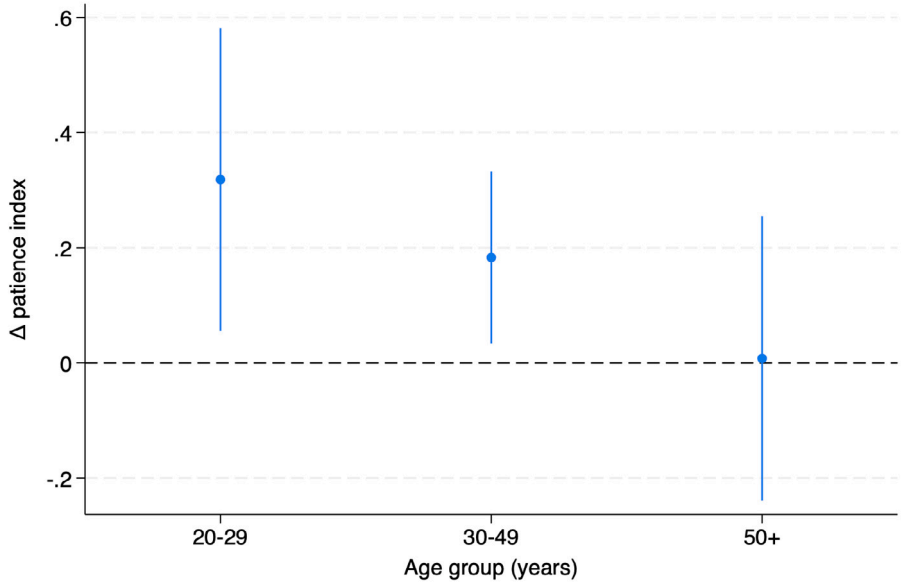
significant effects on risk tolerance reported in studies using samples of young undergraduate students and professionals (Angrisani et al., 2020; Drichoutis & Nayga, 2021; Harrison et al., 2022; Lohmann et al., 2020). The changes are observed almost a year after the onset of the pandemic. This finding suggests that the impact of the pandemic on preference was not entirely driven by the initial shock but might have persisted over time.

Alternative explanations. We interpret the results as evidence that the COVID-19 pandemic increases risk-taking among older cohorts and patience among younger ones. However, since our identification strategy exploits time variation, a relevant concern is that our results are spurious and driven by omitted variables: they might reflect other age-specific variations in the environment, nor the impact of the pandemic. We cannot fully rule out this explanation. However, we can narrow down the set of potential omitted variables to improve confidence in our interpretation of results.

First, the results could reflect life events (like negative health or financial shocks) that are correlated with age. Previous work finds that these events can affect risk attitude (Conte, Levati, & Nardi, 2018;



(a) Change in risk-taking index



(b) Change in patience index

Fig. 2. Change in economic preferences, by age. Notes: Figure displays estimates of the change on risk-taking (or patience) index by age group (β) from columns 1 and 4 in Table 2. The circle represents point estimates, while the vertical lines represent the 95% confidence interval.

Kettlewell, 2019).[9] We explore this explanation by adding indicators of negative health, financial, and crime events (columns 3 and 4). We also include an indicator of the respondent reporting a household member getting COVID-19 but not being ill. We interpret this response as a case of mild or asymptomatic COVID-19.[10]

We observe that our baseline results are robust to controlling for recent life events. In all the cases, we observe similar heterogeneous effects by age. Interestingly, we find a marginally significant relation between negative health events and risk-taking. This result is consistent with some studies that document a link between health shocks and risk attitudes (Decker & Schmitz, 2016). When we distinguish between health events attributed to COVID-19, we observe that both types of events affect risk attitudes by a similar magnitude, albeit the events unrelated to COVID-19 become statistically insignificant. We

[9] Other studies also suggest that emotional states may also matter (Leith & Baumeister, 1996; Lerner & Keltner, 2001). However, we already control for measures of anxiety and depression in all regression models.

[10] Note that due to limited testing during the pandemic, we suspect that respondents might have difficulties correctly attributing a health shock to COVID-19. This issue does not necessarily affect our measure of health events (from all causes), but it might introduce measurement error in variables that distinguish the cause of the illness as well as reports of mild or asymptomatic COVID-19.

find, however, no significant relation between risk-taking and financial or criminal events, not between any life events and patience. Due to the small sample and potential lack of statistical power, we interpret these null results with caution.

Second, the varying changes across age groups might stem from heterogeneity in preference patterns over the life cycle. However, this factor is unlikely to elucidate our findings. Numerous studies establish that risk-taking diminishes with age (Albert & Duffy, 2012; Dohmen et al., 2011; Pålsson, 1996). We validate this inverse association between age and risk-taking through our baseline survey data (see Table A.1 in the appendix). Remarkably, we observe an augmented risk-taking tendency in older cohorts.

Finally, there might be other time-varying unobserved phenomena that could affect preferences, or systematic measurement error in our measure of economic preferences.[11] To the extent that these factors are correlated with age (for instance, if measurement error is more pronounced among older cohorts), then these omitted variables could potentially explain the shifts in preferences, and undermine our interpretation. However, given the lack of quasi-experimental variation and data availability, we cannot make further progress to address this concern.

4. Conclusion

This paper studies the impact of the COVID-19 pandemic on risk-taking and patience. Our empirical analysis uses panel data of cab drivers in Lima (Peru) and survey-based measures of economic preferences. We document a significant increase in risk-taking and patience. The magnitude of the effects is monotonic on age: younger cohorts became more patient, while older individuals became more risk-tolerant.

There are at least two unresolved issues that warrant further investigation. First, it is unclear what is causing the shift in preferences. Data limitations prevent us from doing a more in-depth study of the mechanisms at play. Second, we observe individuals almost one year after the pandemic's onset. This time span is longer than existing studies, which focus on the early weeks and months of the pandemic. However, there is not enough information yet to make an assessment of the long-term impacts on preferences.

CRediT authorship contribution statement

Fernando M. Aragon: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Noelia Bernal:** Conceptualization, Data curation,Formal analysis, Funding acquisition, Writing – review & editing. **Mariano Bosch:** Conceptualization, Funding acquisition. **Oswaldo Molina:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Writing – review & editing.

Data availability

Replication package is available at https://doi.org/10.7910/DVN/AVP8NK.

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[11] For instance, Adema et al. (2022) and Zhang and Palma (2022) find that the impact of COVID-19 varies depending on the method of preference measurement employed: self-assessment measures tend to yield lower levels of risk-taking compared to incentivized measures.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.socec.2024.102257.

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