# Experiments on risk framing and moral appeal in the context of the coronavirus spread

## Pre-Analysis Plan for the second survey wave

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21.08.2020

## I. Introduction

Following up on our first survey wave in March 2020, our study continues in aiming at an improved understanding of the private contributions to a public good under uncertainty. The coronavirus SARS-CoV-2 disease (COVID-19) still dominates life in Germany and all over the world. After a peak in the number of infections in Germany in March 2020, various public and private efforts contained the spread and turned out effective. Hence, the daily number newly infected remained below 1,000 since March 8, 2020 (Robert Koch Institut, 2020). Recently, however, the daily number of new infections is increasing again, and started to exceed 1,000 since August 5, 2020. While in Germany there is no vaccination available yet that has passed all necessary clinical trials and is available at large scale, we are focusing on the public health in the face of the COVID-19 pandemic. Individuals can contribute to this public good by keeping physical distance to others and by increasing their hygienic efforts.

In addition to the focus on physical distancing and increased hand-washing in the first survey wave, we now also ask about other contributions to the public good like wearing a face-mask, which had not been adopted at a large scale previously or the willingness to get vaccinated when a vaccine is available, which is now more

prominently discussed in public. Furthermore, we also add new questions about participants' general wellbeing, and their employment status.

This pre-analysis plan is structured as follows: Section II describes the background and procedures of the second survey wave. Section III lists all data that we elicit as part of this wave and section IV reports pre-specified hypotheses in addition to those of our first wave.

## II. Procedures

This survey wave is part of a panel survey experiment with three waves in total.[1] It includes questions on subjects' current health level, past and planned behavior related to the corona pandemic, support for governmental efforts to slow the spread of the virus, stated preferences as well as incentivised experiments on truth-telling and risk-taking.

In our second survey wave, we try to reach all 3,639 respondents again that participated in the first wave in March 2020. Depending on the willingness to participate in the survey again, we hope to reach between 1,600 and 2,000 respondents in the second survey wave. Depending on the fraction of respondents that participate again, we will add approximately 660 new respondents as a fresh sample.

We plan to start the second wave on August 21, 2020. We will start with a "soft launch" in the morning to collect responses of up to 10% of our targeted sample. After a preliminary check of responses, we will then start with the main data collection in the afternoon. We plan to collect all responses of the fresh sample within 7 days by August 28, 2020, but allow for more time for participants of our first wave. The whole data collection should be completed by September 4, 2020 (i.e. within 2 weeks).

The start of the data collection is scheduled at a time when 11 out of 16 German federal states have no school holidays anymore. With some local exceptions, public schools in these states reconvenied classes in presence. In addition, the German government requires travelers arriving from regions at risk to get a compulsory test for COVID-19 since August 8, 2020. Travelers from any other region or country can get tested for free voluntarily when entering Germany. With regard to the infection rates, the daily number of newly infected is steadily increasing since mid-July and started to exceed 1,000 per day in the beginning of August. As of August 13, 2020,

[1] We pre-registered the first survey wave at the AEA RCT Registry (https://doi.org/10.1257/rct.5573-1.1) and published data of the first survey wave at the Harvard Dataverse (https://doi.org/10.7910/DVN/WEIWDK).

219,964 cases have been confirmed in Germany as well as 9,211 fatalities since the beginning of the pandemic.

In contrast to the first wave, we will not carry out information treatments in order to not conflate the measurement of potential long-term effects of the information treatments in our first wave.

Again, we will exploit three natural sources of variation in the risk to get infected with the coronavirus (resulting in different ratios of private and external benefits of behavioural change):

1) spatial heterogeneity,
2) heterogeneity across societal groups (e.g., respondent's age, such as being older than 60, respondents with pre-existing chronic illnesses), and
3) heterogeneity over time in the course of the pandemic dissemination.

The survey will be conducted by an independent research company (respondi, https://www.respondi.com/EN) that recruits participants and handles payments. Recruitment of participants follows a stratified random sampling procedure against criteria such as age, gender, income and education. While in the first survey wave quotas were managed actively to guarantee the sample's representativeness regarding these criteria, the sample in this second survey wave depends on how the willingness to participate again is distributed among socio-economic groups. The subsample with fresh respondents will be actively managed to ensure representativeness. The money that respondents earn in our two experiments is paid out to them as so-called "mingle points" and one mingle point is worth 1 Euro-Cent.

## III. Data and variables

Table 1 provides the variables that we collect as part of the second survey wave. We will ask some questions only to participants in the fesh sample as they would be redundant for those who participated in the first wave already. Other questions depend on previous answers and might be asked for clarification purposes. We indicate potential filtering options in Table 1 in italic.

| **Table 1. List of Variables (rough translation from German)** | |
|---|---|
| Variable # \| type | Question |
| First of all, we have two questions regarding your general life satisfaction. | |

| | |
|---|---|
| 1 \| numeric | How satisfied are you with your life in general? |
| 2 \| string /categorical | Would you agree with the following statement? “Much of the time during the past week I was happy.” |
| 3 \| numeric | *Ony for participants in the fresh sample:* In which year were you born? |
| 4 \| string /categorical | *Ony for participants in the fresh sample:* What is your gender? |
| 5 \| numeric | *Ony for participants in the fresh sample:* What is the zip-code of your home? |
| 6 \| string /categorical | *Ony for participants in the fresh sample:* What is your level of education? |
| 7a \| numeric | *Ony for participants in the fresh sample:* How many people do you count among your personal circle of family and friends with whom you are in regular contact (i.e. at least once every 3 months)? |
| 7b \| numeric | *Ony for participants in the fresh sample:* How many of them are over 60 years old? |
| 8a \| numeric | *Ony for participants in the fresh sample:* How many people live in your household? (please include yourself) |
| 8b \| numeric | *Ony for participants in the fresh sample:* How many people in your household are children under the age of 18? |
| 8c \| numeric | *Ony for participants in the fresh sample:* How many people in your household are older than 60 years? |
| 9 \| string /categorical | What is your monthly net household income (the remuneration of all household members, after deduction of taxes and social securities)? |
| 10 \| numeric | What do you expect approximately how your annual income will change in the current year 2020 compared to 2019? (in percent) |
| 11 \| numeric | How high is your current monthly net household income compared to February 2020? (in percent) |
| 12 \| string /categorical | Are you currently employed? Which one of the following applies best to your status? |

| | |
|---|---|
| | [Employed full-time, Employed part-time, in marginal or irregular employment, not employed] |
| 13 \| string /categorical | *If any employment in Q12:*<br>What is your current occupational status?<br>[Self-employed, Blue-collar worker, White-collar worker, Civil servant, Student / Apprentice / Trainee / Intern] |
| 14 \| numeric | *If any employment in Q12:*<br>What is the minimum share of your working time, that you need to spend at a place that your employer determines (e.g. in his offices or rooms, on his property, at customers)? (in parcent) |
| 15 \| numeric | *If any employment in Q12:*<br>If you can work from home, to which share of your total working time are you using this option? (in percent) |
| 16 \| numeric | To what extent do you experience the emotion “fear” at the moment? |
| 17 \| numeric | Please tell us: How willing are you to take risks with regard to your finances? |
| 18 \| numeric | Please tell us: How willing are you to take risks regarding your health? |

**Task 1:** Investment game based on Gneezy and Potters (1997), following the implementation by Cohn et al. (2015, 2017). We randomize the payoff profile across two groups:

Now we come to a task where you can earn additional money (mingle points). You will receive 100 Euro-Cent from us for this. You can use this money to invest it in a risky asset. Please decide now, which share of it you want to invest in the risky asset. You will receive the amount that you do not invest for sure.
The risky investment works as follows:

- You have a 50% chance of winning 2.5 times your investment.
- You have a 50% chance of losing your investment.

[**Group Investment_A**:] You win if the super number (between 0 and 9) of the Saturday Lotto drawing on September 12, 2020 (www.lotto.de) is one of the numbers 0, 1, 2, 3, or 4. You lose if the super number of this draw is one of the numbers 5, 6, 7, 8, or 9.

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|---|---|
| [**Group Investment_B**:] You win if the super number (between 0 and 9) of the Saturday Lotto drawing on September 12, 2020 (www.lotto.de) is one of the numbers 5, 6, 7, 8, or 9. You lose if the super number of this draw is one of the numbers 0, 1, 2, 3, or 4.<br><br>Therefore, the amount you earn by investing in this task is calculated as follows:<br>- If you win: Payout = 100 Euro-Cent minus investment plus (2.5 x investment)<br>- If you lose: Payout = 100 Euro-Cent minus investment | |
| Investment \| numeric | How many Euro-Cent would you like to invest (0 - 100)? _____ |
| We would now like to ask you some questions about your health state and the consequences of an infection with the coronavirus. | |
| 19 \| binary | *Ony for participants in the fresh sample:*<br>Do you have one or more of the following diseases?<br>[Heart disease, Lung disease, Liver disease, Diabetes, Cancer, Weakened immune system] |
| 20 \| numeric | How do you assess your health status? [very good, … , very bad] |
| We would now like to ask you some questions regarding an infection with the coronavirus. | |
| 21 \| string /categorical | If you have the opportunity to get tested for corona infection, how willing are you to get tested, even if this involves additional effort for you? |
| 22 \| numeric | How often have you been tested on COVID-19? |
| 23 \| binary | Have you been tested positive for COVID-19? |
| 24 \| string | *If more than zero tests for COVID-19 in Q22:*<br>For which reason did you get tested for COVID-19?<br>[voluntarily, for professional reasons, due to travel regulations, due to contact with an infected person, other reason (to be specified)] |
| 25 \| string /categorical | Have you already fallen ill with the coronavirus?<br>[Yes, No, Maybe, No answer] |

| | |
|---|---|
| 26a \| numeric | *If "No", "Maybe" or "No answer" in Q25:*<br>How likely do you think it is that you will become infected with the coronavirus or that you have already been infected? |
| 26b \| numeric | *If "No", "Maybe" or "No answer" in Q25:*<br>How likely do you think it is that if you are infected, you will only get sick mildly? |
| 26c \| numeric | *If "No", "Maybe" or "No answer" in Q25:*<br>How likely do you think it is that if you are infected, you will be in acute danger of death in case of infection? |
| 27 \| binary | *Filter if "Yes" in Q25:*<br>Have you recovered after the corona infection? |
| 28 \| numeric | How many persons among your family members and friends, with whom you are regularly in contact (i.e., at least once every 3 months), got infected with the coronavirus? |
| 29a \| numeric | *If answers is greater than zero in Q28:*<br>How many persons among your family members and friends, with whom you are regularly in contact (i.e., at least once every 3 months), have been treated due to the coronavirus in a hospital? |
| 29b \| numeric | *If answers is greater than zero in Q28:*<br>How many persons among your family members and friends, with whom you are regularly in contact (i.e., at least once every 3 months), died due to the coronavirus? |
| We would now like to know to what extent the following statements apply to you. In the following, "physical, social contact" refers to situations in which you come closer than two metres to other people. | |
| 30 \| numeric | Compared to the same time period last year, by what percentage have you reduced or increased your physical, social contacts in the past 7 days? |
| 31 \| numeric | How many people on average came closer than 2 meter to you on a single day? (Please calculate the average number for the past 7 days) |
| 32 \| numeric | Compared to the same time period last year, by how many percent have you reduced or increased your intensive hand washing (longer than 20 seconds) in the past 7 days? |

| | |
|---|---|
| 33 \| numeric | As far as you reduce physical, social contacts or take protective efforts such as intensive hand washing, in what proportions (in percentage points that sum up to 100%) do you do this in order to<br>- Protect yourself and members of your household [x%]<br>- Protect your family and close friends [y%]<br>- To protect other people [100-x-y%] |
| We now have some questions regarding your future expectations. | |
| 34 \| string / categorical | When do you think a vaccination against COVID-19 that is authorized in Germany will be available on a large scale? |
| 35 \| string / categorical | What do you expect, when will we be able to live again without substantial restriction due to COVID-19? |
| We would now like to know what you are planning for the next 7 days: | |
| 36 \| numeric | Compared to the same time period last year, by what percentage will you reduce or increase your physical, social contacts in the next 7 days? |
| 37 \| numeric | Compared to the same time period last year, by what percentage will you reduce or increase your intensive hand washing (longer than 20 seconds) in the next 7 days? |
| We would now like to know to what extent you agree with the following statements. | |
| 38 \| numeric | The current government measures to contain the COVID-19 pandemic are… [going way too far, …, are not nearly enough] |
| 39 \| numeric | Relative to the governmental regulations, I will limit my physical, social contacts as follows: [participation in Corona-parties, …., complete avoidance of all contacts] |
| Imagine there will be a reliable and authorized vaccination against the coronavirus available in Germany. | |
| 40 \| numeric | How likely is it that you will get vaccinated voluntarily? [impossible, …, for sure] |
| 41 \| numeric | *If the probability is greater than zero in Q40:*<br>If you would get vaccinated voluntarily, in what proportions (in percentage points that sum up to 100%) do you do this in order to<br>- Protect yourself and members of your household [x%]<br>- Protect your family and close friends [y%] |

| | |
|---|---|
| | - To protect other people [100-x-y%] |
| We would now like to know, by how much you agree to the following statements. | |
| 42 \| numeric | It should be compulsory, to get a vaccination against the coronavirus. [completely disagree, …, fully agree] |
| 43 \| numeric | Relative to the governmental regulations, I am wearing my face-mask… [never, …, as requested, … , always] |
| 44 \| numeric | If somebody is not wearing his face-mask at a place where it is required to do so by regulations, or if somebody is not wearing it correct (e.g., by not covering the nose),…<br>- this bothers me [not at all, … , a lot]<br>- I will point this out to that person [not at all, …, energetic]<br>- I will point this out to other persons [not at all, …, energetic] |
| 45 \| numerically | If you wear a face-mask, in what proportions (in percentage points that sum up to 100%) do you do this in order to<br>- Protect yourself and members of your household [x%]<br>- Protect your family and close friends [y%]<br>- To protect other people [100-x-y%] |

**Task 2:** Coin tossing game, such as by Abeler et al. (2014), implementation following Cohn et al. (2014). For participants that participated already in the first survey, we randomize them across two groups and provide them with an information treatment. Participants in the fresh sample, are not randomized and do not see the information treatment:

Now, we come to another task where you can earn additional money (mingle points). In this task, your additional payout is decided by coin tosses. Please get a coin with heads and tails for this.

[**Group Coin_A:** ]

[**Group Coin_B:** Note: We ask you to use a real coin for this task. There exists no known case of an infection with the coronavirus which is due to contact with a coin. Nevertheless, please use only a clean coin and wash your hands afterwards.]

Your task is to toss the coin exactly 10 times. Every time you toss "tails", you will receive 0.20 Euro, for a total of up to 2.00 Euro.

| | |
|---|---|
| Tails \| numeric | Please enter the number of your tosses with “tails” at the top in the following field: [____] |
| Imagine, you would have the choice to receive a monetary payoff today or in 12 months. We will present you five situations in which the payoff today is always the same. The payoff in 12 month, however, will differ in each situation. For each situation, we would like to know which payoff you prefer. Please assume that there is no inflation, such that future prices are the same as today. | |
| 46 \| numeric | *This question is adapted from Falk et al. (2018). It is repeated up to 5 times with varying payoffs for the future time period.*<br>Please assess the following situation. Would you rather prefer 100 Euro today or 154 Euro in 12 months.<br>[Today, in 12 months, do not know / prefer to not answer] |
| Please answer the following questions: | |
| 47 \| string /categorical | How willing would you be to give up something that is beneficial for you today in order to benefit more from that in the future? |
| 48 \| string /categorical | How much would you be willing to punish someone who treats you unfairly, even if there may be costs for you? |
| 49 \| string /categorical | How much would you be willing to punish someone who treats others unfairly, even if there may be costs for you? |
| 50 \| string /categorical | How much would you be willing to give to a good cause without expecting anything in return? |

In addition to the variables collected as part of the first survey wave, we will collect observable data that can be matched to respondents through information about their zip-code. Among those information will be the number of officially confirmed COVID-19 incidents by the Robert Koch Institute (https://survstat.rki.de/), the number of deaths from COVID-19, and regulatory stringency. As these types of information might not be available on the zip-code level but on the county level, our matching might be based on a higher spatial aggregation.

| | |
|---|---|
| COVID_incidence | Number of officially confirmed COVID-19 incidents per county (Source: Robert-Koch-Institute) |

| | |
|---|---|
| COVID_death | Number of officially confirmed COVID-19 deaths<br>(Presumably on the county level by Robert-Koch-Institute) |
| Reg_string | Regulatory Stringency<br>(Based on regulations by the individual federal states, following classifications - if applicable - by the Oxford COVID-19 Government Response Tracker (OxCGRT)) |

## IV. Hypotheses of individual sub-projects for the second survey wave

Following up on our hypotheses of our first wave, we update them as follows:

### A. Risk attitudes, risk exposure and the private provision of a public good under uncertainty

Economic theory predicts that risk-averse individuals may provide more of a public good if they (also) benefit from a (private) risk-reducing effect of providing the public good. For example, Bramoulle and Treich (2009) consider a game with pollution emissions that generate stochastic damage that has a public good character. They show that risk increases individual abatement efforts and thus private provision of the public good. As a consequence, risk may increase welfare. Quaas and Baumgärtner (2008) and Baumgärtner and Quaas (2010) show that individual efforts to conserve biodiversity increase with risk and risk aversion due to the natural insurance function of biodiversity. Also, lab experiments in threshold public good games suggest that risk may lead to improved outcomes (McBride 2006; Tavoni et al. 2011; Barrett and Dannenberg 2014). Here we aim to use the data from the survey to test the implications of the theory and the validity of those lab experiments.

Individual protective measures with respect to the coronavirus have exactly the property that they reduce, at the same time, the individual probability of getting infected and the probability to spread the virus. Thus, we expect that risk averse individuals would contribute more to the public good.

We measure individual risk aversion by stated preferences (W1Q10, W1Q11, W2Q17, W2Q18) and revealed preferences (W1Q12, W2Investment). The amount of private provision of the public good is measured by stated past and planned individual defence efforts (W1Q17, W1Q18, W1Q20, W1Q21, W2Q30, W2Q32, W2Q36, W2Q37), the assessment of public policies

(W1Q22, W1Q23, W2Q38, W2Q39, W2Q42, W2Q43), the willingness to get vaccinated voluntarily (W2Q40). We further need to control for individual risk exposure with respect to the severity of health damage in case of an infection (age, health); with respect to the (objective or subjective) probability of infection; and with respect to the effect on close relatives (household members, family and friends).

We will test the following hypotheses by means of multivariate regression, using the variables specified in the previous paragraph. All the following hypotheses are ceteris paribus, i.e. controlling for the effect of the other variables.

*A_H1: Private provision of the public good increases with risk aversion.*

*A_H2: Private provision of the public good increases with individual risk.*

*A_H3: Private provision of the public good increases with the aggregate risk of household members and friends (number of elderly people).*

*A_H4: Private provision of the public good increases relatively more with overall risk (COVID_incidence) for those who state a higher share for being motivated for a concern for other people (W1Q19, W2Q33, W2Q41, W2Q45).*

## B. Long-term effects of the information/moral appeal treatments

In our first wave in March 2020, we provided subjects with different sets of information as well as moral appeals.

In the first information treatment, we made risk concerning COVID-19 either more or less salient. Subjects received factual information about the health and economic risk triggered by the coronavirus and we varied those messages to impose a high-risk and a low-risk framing.

In the second treatment, we provided subjects with a statement of a medical infectologist that appeals to a subject`s moral. His statement highlighted either the moral duty of subjects (deontological ethics) or subjects' consequences (consequentialist ethics).

Although we treated participants only once and some months have passed since our first wave, there is a chance that our information treatments had long-term effects. Hence, we formulate:

*B_H1: Moral appeals (both deontological and consequentialist) from the first wave (M_Deont, M_Conseq) lead to higher defence efforts/private public good contributions (*W2Q30, W2Q32, W2Q36, W2Q37*) ~5 month later as compared to the control group (M_BASE) and the fresh sample.*

*B_H2: Moral appeals (both deontological and consequentialist) from the first wave (M_Deont, M_Conseq) lead to fewer infections (W2Q23) of treated individuals.*

*B_H3: Respondents in the high-risk (HRT) and low-risk treatment (LRT) from the first wave have higher defence efforts/private public good contributions (*W2Q30, W2Q32, W2Q36, W2Q37*) ~5 month later as compared to the control group (R_Base) and the fresh sample.*

## C. Coin-tossing: temporal stability and experience effects

In both survey waves, we conducted a coin tossing experiment (following the 10 coin tosses of Cohn et al. 2015). As far as we are aware, this is the first large-scale panel study on coin tossing. If cheating on a coin-tossing experiment is a stable predictor of social preference on honesty, we would expect that there is some consistency in over-reporting. We thus hypothesize:

*C_H1a: Reporting of coin-tosses in the first and second wave is positively correlated.*

*C_H1b: This correlation is particularly strong for those with very low (0,1,2 winning coin tosses) and very high (8,9,10 winning coin tosses) reports in the first wave.*

Assuming that there is a non-negligible fraction of subjects adhering to some notion of consequentialist ethics, we expect that, as subjects experienced that they can overreport without any consequences in the first wave, more subjects will tend to over-report in the second wave. We thus hypothesize:

*C_H2: On average the number of winning coin tosses individuals report in the second wave is higher than in the first wave.*

We further hypothesize that the detection risk matters for reported winning coin tosses only from the third wave onwards. We will formulate the corresponding hypothesis in the pre-analysis plan for that wave.

To disentangle temporal instability from experience effects, we recruit 660 new participants (fresh sample) to pick up a potential time effect that may

impact coin tossing. Differences between the two samples - old and fresh - should thus be indicative of having participated in the coin tossing experiment before. In line with C_H2, we expect that this will likely increase reports for the `experienced' participants. We thus hypothesize:

*C_H3a: The average reported number of winning coin tosses is higher in the pool of returning participants as compared to the fresh sample.*

*C_H3b: This correlation is particularly strong for those with very low (0,1,2 winning coin tosses) and very high (8,9,10 winning coin tosses) reports in the first wave.*

In the first wave, a few respondents reported that they did not toss a coin because they feared an infection risk due to an unclean coin. This may also be the case for other respondents. Such respondents may have just picked a number instead of actually tossing the coin. This may have driven the double hump-shaped reporting curve, with spikes at 4 and 6 times tails, that we observed. To study this, we added a short information treatment that randomly presented the following information to half of the panel participants:

"Note: We ask you to use a real coin for this task. There exists no known case of an infection with the coronavirus which is due to contact with a coin. Nevertheless, please use only a clean coin and wash your hands afterwards."

We hypothesize that:

*C_H4: There are more reports of 5 winning coin tosses in the information treatment, and overall fewer 4 and 6 reports. Relatedly, we expect that the distribution of coin tosses follows the binomial distribution more closely in the information treatment.*

## D. Coin-tossing: adherence to regulations

Based on the various studies that have shown some form of external validity of the coin tossing task concerning other measures of truth-telling or cheating (e.g. Cohn and Maréchal 2018, Potters and Stoop 2016), we hypothesize that a similar correspondence may be observed for the case of adhering to governmental regulations in the COVID-19 pandemic response. We thus hypothesize:

*D_H1: The number of reported winning tosses, pooled over both survey waves, is positively correlated with non-adherence to governmental regulations (*W1Q23, W2Q39, W2Q43*) and negatively correlated with the*

*private provision of public goods (*W1Q17, W1Q18, W1Q20, W1Q21, W2Q30, W2Q32, W2Q36, W2Q37*).*

*D_H2: The average number of reported winning tosses over both waves is positively correlated with the number of corona infections reported in the second wave (W2Q23).*

*D_H3: The average number of reported winning tosses over both waves is positively correlated with the number of corona infections among family members and friends reported in the second wave (W2Q28).*

## E. Effect of risk expectations on private public good contributions

Expectations can become a relevant factor for individual decision making when individuals consider the future implications of their current behavior. While the spread of the coronavirus over the coming weeks and months is uncertain, policymakers explicitly highlight the dynamic implications of current defence efforts ("flatten the curve"). Hence, we explore the effect of expectations about respondents' health risk on the private public good provision.

### Between subject estimation

Our risk treatment of the first survey wave was designed to examine the role of risk expectations between subjects. Hence, we affected respondents' expectations about the health-related and economic risk of the COVID-19 pandemic with information treatments. We use the treatment-induced variation in risk expectations in the first survey wave to estimate the effect of expectations on the private public good provision in the first survey wave following a two-stage approach.

In the first stage, we focus on the treatment effect on risk expectations. Our two treatments are designed to make health and financial risks salient. Thus, we expect an impact on respondent's general emotions and risk expectations, which we test through the following hypotheses:

*E_H1: The more salient the (health-related and economic) risk is, the higher is the fear level (W1Q8).*

*E_H2: The more salient the (health-related and economic) risk is, the lower the expected income (W1Q9) and the lower the willingness to take risk (W1Q10, W1Q11).*

While the information treatment focuses particularly on the spread of the coronavirus, we expect stronger changes in risk expectations about

individuals' health risk. In the high (low) risk treatment, we expect that both the perceived probability of getting infected as well as the severity of potential health damages become relatively high (low):

*E_H3: Respondents in the high-risk treatment (HRT) report a higher likelihood to get infected than respondents in the low-risk treatment (LRT) (W1Q16a).*

*E_H4: Respondents in the low-risk treatment (LRT) report a lower likelihood to get seriously endangered than respondents in the high-risk treatment (HRT) (W1Q16c).*

With respect to the investment task of the first survey wave, we do not expect any effects of the risk treatment. We control the risk profile in this task. All respondents have full information about the probability of winning and losing and are aware that winning and losing is determined exogenously. Therefore, the only effect of the risk treatment on the behavior in the investment task could be via the perceived background risk, while the actual background risk remains unaffected by the information treatment. We hypothesize, however, that the treatment effect on the perceived background risk does not change behavior on average:

*E_H5: The risk treatment does not affect behavior in the investment task (W1Q12).*

Given E_H5, the incentivized investment task would allow us to capture risk-preferences independent of the information treatment.

In the second stage, we focus on the effect of risk expectations on the private public good contribution. We expect that risk preferences and expectations about an individual's health risk both determine private public good contributions. In particular, we expect that high expectations about one's own health risk increase private public good contributions, which also reduces the individual probability of getting infected, and exacerbate risk and time preferences. Hence:

*E_H6: The higher the individuals' expected health risk (W1Q16a-c), the higher future private public good contributions (W1Q20, W1Q21).*

*E_H7: Risk averse subjects (primarily W1Q12; additionally we also consider W1Q10, W1Q11) with high (low) expectations about their health risk (W1Q16a-c) will contribute more (less) to the public good (W1Q20, W1Q21) than risk averse subjects with moderate expectations.*

*E_H8: Subjects with a high utility of their current (future) consumption, split at the median response for (W1Q25), will contribute less (more) to the public good (W1Q20, W1Q21).*

**Within subject estimation**

An advantage of our panel survey is that we can observe subjects at multiple occasions. We exploit this feature to examine changes over time that we measure within subjects. We expect that changes in the local infection rates affect the background risk and therefore lead to different financial investments and private public good contributions over time. When we compare the investment level and level of private public good contributions between the first and second survey wave, we expect the following:

*E_H9: Subjects that live in a region in which local infection rates increased by more than average from the first to the second survey wave, will invest less than in the first survey wave (W1Q12, W2Investment).*

*E_H10: Subjects that live in a region in which local infection rates (*COVID_incidence*) increased by more than average from the first to the second survey wave, will provide more to the public goods (*W2Q30, W2Q32, W2Q36, W2Q37*).*

Regarding our hypotheses on the long-term effect of the risk framing treatment, please refer to Subsection B.

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